1982

Women in industrial arts: a recruitment model

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Women in industrial arts:

A recruitment model

by

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A Thesis Submitted to the

Graduate Faculty in Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

Major: Industrial Education

Iowa State University
Ames, Iowa

1982

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CHAPTER I. INTRODUCTION

In traditionally male-dominated fields, such as industrial arts, it is often difficult for women to enter and establish themselves as successful members of the profession. The implementation of Title IX and other affirmative action programs has provided women with the legal right to seek careers in the field of their choice.

Each year, more women are entering the work force for a variety of reasons. According to the Bureau of Labor Statistics, the majority of women work because of economic need. In 1978, almost two-thirds of the women in the labor force were single, widowed, divorced or separated, or had husbands who earned less than $10,000. The 42 million women in the labor force in 1978 constituted more than two-fifths of all workers. The Bureau of Labor Statistics estimates that 95 per cent of all women will work for pay at some time during their lives.

The majority of women are still employed in three low-paying occupational areas--clerical, service and sales. In 1978, women constituted 80 percent of all clerical workers, 63 percent of all service workers and 64 percent of all retail sales workers. In contrast, women were six percent of all craft workers, 43 percent of professional and technical workers and 23 percent of nonfarm managers and administrators. The average woman worker earned only about three-fifths of what a man

did in 1978 (U.S. Department of Labor (1979).

Though the effect is lessening, societal pressures are still encouraging traditional roles for women. As women become an increasing part of the work force, they should consider non-traditional occupations that are economically rewarding.

Recruiting women into male-dominated occupations is a difficult process. The industrial arts profession is no exception. The Report of Survey Data from the Industrial Arts Standards Project at Virginia Polytechnic Institute and State University indicated that 526 teachers out of a total of 55,235 industrial arts teachers in the 42 states that responded for 1977-78 were women.

Recruiting more women into the industrial arts profession will help lessen the teacher shortage and provide students with non-traditional female role models. Identifying the successful recruitment strategies of undergraduate industrial arts institutions in the United States will contribute to the development of a recruitment model the profession can use to bring in more women.

Problem of the Study

The problem of this study was fourfold:

1. To determine institutions where female industrial arts teachers have received their baccalaureate degrees.
2. To determine factors which contribute to successful recruitment and graduation of women.

3. To determine common characteristics of female industrial arts teachers.
4. To develop a recruitment model with identified target populations for use by institutions to bring more women into their industrial arts programs.

Purpose of the Study

The purposes of this study were as follows:

1. To provide the profession with the names of those institutions that have successful recruitment strategies in getting and keeping women in industrial arts programs and identifying what those strategies are.
2. To provide the profession with a profile of the common characteristics of female industrial arts teachers.
3. To provide the profession and industrial arts institutions with a recruitment model that can be used to bring more women into the field.

Need for the Study

The industrial arts profession is one that is facing critical shortages of teachers, a trend that is expected to continue into the 1980s. According to a survey conducted by Miller (1981) for Industrial Education magazine, for the 1980-81 school year, 41 states reported shortages of industrial arts teachers. A total of 1,508 industrial arts teachers were needed in the United States, Puerto Rico and the Virgin Is-

lands. A small surplus of industrial arts teachers was reported in two states.

To meet the need for industrial arts teachers, Feirer (1981) suggested recruiting from the following groups: academic teachers, retirees, and women. Concerning recruiting women as industrial education teachers, he stated:

> Today there is great emphasis on interesting women in nontraditional occupations which formerly were male-dominated. For example, organizations such as the National Association of Women in Construction are trying to to attract women. Why should we not have more women in industrial education? While no one can force them to elect this area as a career, as professionals we should make a special effort to interest women in this area of teaching. (p. 6).

The Recruitment Committee of the American Industrial Arts Association has recognized the potential for women in industrial arts. One of the committee's responsibilities, as outlined in the AIAA Committee Handbook (1981-82), is "to develop an intermediate and long-range plan to encourage men and women to enter the profession of industrial arts teaching" (p. 27). Other AIAA committees concerned with recruiting women into the profession are Publications and Affirmative Action.

The potential for women in industrial arts as well as the problems of sex role stereotyping are factors to consider in recruitment. According to Brueckman (1980):

> We must continue to encourage female enrollments and employment in the industrial arts field because as the current research indicates, sex role stereotyping and

> bias does negatively affect both males and females in their career choices and opportunities.... No matter what overt acts teachers and administrators take to attract women into their programs, these attempts will be totally ineffective unless attitudes support actions (p. 12).

In order to alleviate the effects of sex-role stereotyping and expose women to the profession, positive experiences in industrial arts should be provided at all four levels--elementary, junior high, senior high and post secondary (King, 1976). Once the initial barriers of sex-role stereotyping are overcome, women can develop their skills and knowledge in technology to take their place in industry and teaching. Active recruiting programs can provide an increasing number of female role models at all four educational levels.

Women are not the only ones to benefit from involvement in industrial arts. According to Patterson (1975):

> By having classes that are sexually balanced, we can convey to school administrators that our subject has wide appeal among the students.... Girls in industrial arts classes can help students and instructors see girls in new roles, exploring new avenues of expression, growing in diversity and confidence....
>
> By altering the sex makeup of his class, the instructor will be obliged to change his perspectives and methods of teaching the teenager....
>
> Women can help industrial arts by putting members of our profession in the position of viewing our function in the school curriculum with a wider perspective (p. 414).

Males in the profession have recognized the need to recruit women. Mangano (1975) in a session at the American Industrial Arts Association Conference in Cincinnati in 1975 issued tne following challenges.

> Colleges and universities must actively recruit women to enter undergraduate and graduate study in industrial arts, and they should be encouraged to major in non-traditional areas. Colleges and universities must find and recruit qualified women for their industrial arts faculties, to eliminate discrimination and to provide role models for other women (p. 406).

Recruitment efforts in engineering and other technical programs have proven successful in increasing the number of women in these fields. The FACET (Female Access to Careers in Engineering Technology) program at Trident Technical College in Cnarleston, South Carolina, increased female enrollment from 50 women in the fall quarter of 1977 to 224 women for the fall quarter of 1980 (Jolley, 1981). A similar recruitment effort at the University of Santa Clara in California brought more women into the engineering program. The enrollment of women increased from 14 percent of the engineering students in 1978 to 20 percent in 1979 (Hirschfield and Hornberger, 1980).

The reasons for increasing the number of qualified women in industrial arts are varied. There is the legal and social responsibility and also the commitment to the continued existence and improvement of the industrial arts profession. Identifying successful recruitment strategies can only serve to benefit industrial arts at all levels.

Questions of the Study

The questions to be answered by this study were:

1. What institutions in the United States are leaders in the

recruitment and graduation of women in undergraduate industrial arts programs?

2. What are successful recruitment strategies for getting women into the industrial arts profession?
3. What are some of the common characteristics of female industrial arts teachers?

Assumptions of the Study

This study was conducted with the following assumptions:

1. Females graduating with certification to teach industrial arts over the past 10 years represent a very small portion of the total number of industrial arts graduates.
2. Each industrial arts department will have accurate records on the number and sex of graduates over the past 10 years.

Limitations of the Study

The results of this study were limited to the following:

1. The questionnaires were developed specifically for use in this study by the author.
2. The model was developed from information provided by the 30 leading industrial arts institutions in the recruitment and graduation of women.
3. The profile of women in industrial arts was developed from information provided by 50 randomly selected female industrial arts teachers.

Procedure of the Study

This study was conducted as follows:

1. Develop written survey. Number of female graduates in teaching, female graduates in industry and technology programs, male graduates in teaching and male graduates in industry and technology programs was requested. This information was for each year from 1970-1980. Data for females prior to 1970 was also requested. There were columns for current enrollments in these four categories. Department heads were asked to supply the names and addresses of three female graduates currently teaching industrial arts.
2. Pilot test graduates and enrollments in industrial education survey utilizing five randomly selected department heads. The American Council on Industrial Arts Teacher Education Directory was the source of names and addresses.
3. Analysis of response and data from pilot survey. This included rate of return and completeness of survey information requested.
4. Revision of survey instrument.
5. Dissemination of initial survey to the 205 undergraduate industrial arts institutions in the United States as listed in the Directory of Colleges and Universities Offering Degrees in Industrial Arts from the American Industrial Arts Association.

6. Compile numerical data from survey. This involved totaling the number of graduates and current enrollments in each of the four selected groups.
7. Determine the top 30 institutions on the basis of the total number of female teaching graduates over the past 10 years and current enrollment.
8. Develop survey for department heads to determine reasons for the increasing number of female graduates. Areas included were recruitment practices, such as teacher contacts (both male and female), departmental films and brochures, campus visits, recruiters in schools, support services in the department and on campus, geographical location and others.
9. Develop survey for female industrial arts teachers. This survey was conducted by phone or personal interview when possible. Areas included were demographic information, influences on career choice, how they became involved in industrial arts, and background.
10. Pilot test surveys. The first survey was sent to five randomly selected department heads from the top 30 institutions. The second survey was pilot tested utilizing five randomly selected women from the lists provided by the department heads in the initial survey.
11. Analysis of response and completeness of information re-

quested on second surveys. Test statistical procedures on data from pilot surveys.

12. Revision of survey instruments.
13. Dissemination of second survey to the department heads of the leading institutions in the recruitment and graduation of women.
14. Dissemination of survey to the 45 randomly selected female industrial arts teachers.
15. Compile data from surveys. This involved calculating standard descriptive and correlational statistics. The Kolmogorov-Smirnov test was used to analyze data from the recruitment practices surveys.
16. Develop graphical model of successful recruitment practices with identified target populations from information provided by the 30 leading institutions in the recruitment and graduation of women and 50 randomly selected female industrial arts teachers.

Definition of Terms

Industrial Arts--A field which provides opportunities for all students from the elementary through higher education to develop an understanding about the technical, consumer, occupational, recreational, organizational, managerial, social, historical and cultural aspects of industry and technology. Furthermore, it is a field wherein students

acquire industrial-technical knowledge and competencies through creative and problem-solving learning experiences involving such activities as experimenting, planning, designing, construction, evaluating, and using tools, machines, materials and processes. (Iowa Guide for Curriculum Improvement in Industrial Arts, K-12)

Model--Something set or held before one for guidance or imitation. (Webster's New Collegiate Dictionary) The recruitment model will graphically present successful recruitment strategies that industrial arts departments can adapt or adopt for their own programs.

Technology--A process undertaken in all cultures (universal), which involves the systematic application of organized knowledge (synthesis) and tangibles (tools and material) for the extension of human faculties that are restricted as a result of the evolutionary process (Pytlik, Lauda and Johnson).

Industry--A societal institution that develops and uses technology in conjunction with human and natural resources to develop, produce (substantially change the form of materials), and service industrial material goods.

Industrial Technology--The systematized knowledge derived from the nature, the principles and practices, the products, the services, and energies employed by industry. (Iowa Guide for Curriculum Improvement in Industrial Arts, K-12)

CHAPTER II. REVIEW OF LITERATURE

Industrial Arts Teacher Supply and Demand

While some curriculum areas are experiencing an oversupply of teachers, industrial arts continues to be an area where demand exceeds supply. This shortage of industrial arts teachers has persisted for almost three decades and possibly longer because of the lack of early studies on supply and demand. This long-term problem has produced a number of research projects that attempted to assess the severity of the situation and develop solutions to increase the supply of industrial arts teachers.

In 1975, the Research Committee of the Association for School, College and University Staffing conducted a study on the status of teacher demand. The survey to all placement services in the United States confirmed what had previously been suspected for the past decade. Of the 40 states, plus Washington D.C., that responded, none reported an oversupply of industrial arts teachers. Nine states reported that a balance was maintained. The majority of states, 31, reported a severe undersupply (Zook, 1976).

The Recruitment Committee of the American Industrial Arts Association, chaired by Donald Smith (1979), conducted a study on teacher supply and demand in the fall of 1978. The questionnaire was sent to placement directors from schools that had

graduated 10 or more industrial arts teachers in 1977 and state supervisors of industrial arts. They were asked their opinion on the status of industrial arts teacher supply and demand in their state. From their responses, 21 states were identified as having severe shortages of industrial arts teachers. These were Middle Atlantic, Midwest and Plains and Rocky Mountain states. Moderate shortages were reported in 21 states in the Northeast, Appalachian and Western regions. Nine states, including Florida, California and Hawaii, reported only a very modest shortage. Some states reported more shortages of teachers in rural areas, although there were shortages in suburban and urban areas as well.

In this study, the state supervisors were concerned with how the supply of teachers was affecting industrial arts programs. "Eighteen supervisors reported several programs in each of the states closed due to lack of teachers. Many others reported that programs have not expanded as planned because of the shortage" (p. 12). Some schools had closed programs and were no longer looking for industrial arts teachers. Smith reported that not only were the number of programs a concern, but the quality as well. "Many supervisors expressed concern that the quality of industrial arts programs was suffering because schools could not be selective enough in hiring teachers" (p. 12).

A follow-up study by the American Industrial Arts Association Recruitment Committee in the fall of 1979 revealed that the

teacher shortage had not improved, but continued to grow larger. Comments from state industrial arts supervisors indicated more programs were closing and unqualified teachers from other areas were getting temporary certification in industrial arts. Their concern was not only with filling teacher vacancies, but with the quality of existing programs (Gore, 1981).

Industrial Education magazine has conducted an annual survey on industrial arts teacher supply and demand for the past two years. According to Miller (1980), in 1977-78, there were 3,752 industrial arts teachers graduated from colleges and universities in the United States. Even with these graduates, the following was reported:

> Forty-nine states plus Puerto Rico need industrial arts teachers. One state reported a surplus of industrial arts teachers. There were 58,862 industrial arts teachers in the United States and Puerto Rico. There is a shortage of 1,391 industrial arts teachers. States in need of 50 or more industrial arts teachers are California, Florida, Kansas, Louisiana, Missouri, New York, Virginia, Texas, Ohio and Illinois (p. 24).

In a response to the preceding results, John Feirer (1980) warned the profession that the shortage was reaching the crisis stage and predicted that if present trends continued, there could be shortages of 5,000 to 6,000 industrial education teachers per year. A major concern has been the reduced enrollment in all areas of education. The demand by industry and business has caused colleges and universities to

revise their curriculums to emphasize industrial technology and industry oriented programs. This resulted in a corresponding decrease in teacher education programs. To increase the number of teacher education students, Feirer suggested the following:

1. Colleges and universities should actively recruit and provide scholarships for students in teaching as they do for technology students.
2. A computer-assisted placement center for industrial arts teachers should be implemented to match the right person with the right job.
3. State directors of industrial arts should use state vocational funds to increase the number of students going into teaching (p.9).

The Industrial Education survey on teacher supply and demand for the following year, 1978-79, revealed a slight decrease in the number of states that reported shortages of industrial arts teachers. A major concern, though, was the decline in the number of enrolled industrial arts majors in college. The results of the survey were reported by Miller (1981):

-Forty-one states plus Puerto Rico and the Virgin Islands need industrial arts teachers.
-Two states reported small surpluses.
-There were 59,087 industrial arts teachers in the United States, Puerto Rico and the Virgin Islands.
-The primary reason for not entering or staying in the profession was more money from industry.
-States in need of 50 or more industrial arts teachers were Illinois, Indiana, Louisiana, Massachusetts, Missouri, Texas and Washington (p. 15).

The most extensive research done in the industrial arts profession in recent years was the data for the Standards for Industrial Arts Project at Virginia Polytechnic Institute and

State University. Pinder and Rieber (1980) reported on teacher supply and demand:

> In 1976-77, there were at least 812 vacant industrial arts teaching positions in 27 states. Texas (265), Indiana (89) and California (84) reported the greatest number of vacancies. In 1977-78, there were 838 vacant positions in 32 states. In 1978-79, there were 1,077 vacant positions in 34 states (p. 60).

From these data, it was apparent that the number of states with vacancies as well as the total number of vacancies was on the increase. During this three-year period, only eight states reported no teaching vacancies. From 1977-78 to 1978-79, 21 states had increases while only seven states experienced declines in the number of vacant industrial arts positions.

According to Dr. Trevor Howe of the Education Placement Office at Iowa State University, in an interview with Waite (1981) that appeared in the Iowa State Daily.

> In Iowa, fewer than half who graduate in education find teaching jobs immediately...not all areas of teaching are flooded by applicants, however. The physical sciences, math, vocational agriculture and industrial arts are subjects for which a shortage of qualified teachers is "critical" (p. 3).

Wolansky (1979) identified the following factors that constrain the supply of industrial arts teachers:

- Traditionally, industrial arts has recruited teachers only from the male ranks while other teaching specialties attract members from both sexes.
- In many teacher training institutions, industrial arts facilities, curricula, and scholarships are below average in prestige and financial support.
- Since Sputnik, the emphasis on science, math and engineering has remained relatively unchanged....

> -Teacher salaries have not kept pace with those in industry....
> -The ideal supply of industrial arts teachers is not a fixed thing, but rather a moving and rapidly expanding quantity.
> -High school students are not counseled about alternative careers, including teaching, after graduation from an industrial arts college curriculum.
> -Public relations efforts by college departments of industrial education have been ineffective in promoting awareness of the critical shortage of teachers.
> -Until very recently, the lack of state and federal support to provide facilities and equipment in the college setting has made this curriculum area less appealing....
> Factors that influence demand were identified as:
> -The high turnover rate of all teachers, including those in industrial arts with a mean of six years in the profession, contributes to the persistent demand....
> -The Industrial Arts Curriculum project of the '60s, the career education emphasis of the early '70s and the focus on technology in industrial arts in the later '70s have created the impetus for expanding industrial arts programs....
> -Notwithstanding program expansion, when and if the pool of practicing IA teachers does increase, the attrition due to retirements, disability, transfer to industry and other exits from the profession continues to keep the demand high.
> -Promotions within the teaching profession; more industrial arts teachers into supervisory, administrative and other related assignments....
> -The competitive salaries and, in some instances, more attractive compensation in industry lure a considerable number of industrial arts teachers from the classroom, thus creating further demand (p. 36).

Compounding the problem of current shortages of industrial arts teachers is the projection of shortages of teachers in all curriculum areas in the 1980s. According to U.S. News and World Report ("Tomorrow", 1980).

> In all public schools, a shortage of teachers is imminent. Low pay and constant hassles have led many instructors to move into other careers. The number of teachers with 20 years of experience has dropped by almost half in 15 years (p. 10).

Further evidence of this trend is provided by Musemeche and Adams (1978). They stated, "Overall, there has been a precipitate decline in the number of people preparing to become teachers in the United States" (p. 691). A large state university reported college of education enrollment in 1967 that exceeded 2,100 students had dropped to 1,000 in 1977. A major private university's teacher education enrollment dropped from 1,000 to 307 during that same period. According to the Research Division of the National Education Association, the downward trend in enrollment in teacher education programs began in 1972. The NEA reported that by 1976, enrollments had declined 26 percent from the 1972 level (p. 691).

Herman (1978) presented more evidence on the declining number of people completing teacher education programs. An Association for School, College, and University Staffing Research Committee report showed that for 1968-69, 81,296 undergraduates completed student teaching. By 1975-76, that figure had declined to 65,974. Herman warned educators that this type of trend is difficult to reverse. The Chronicle of Higher Education in 1976 reported a survey that nearly 22 percent of freshmen entering U.S. colleges in 1965 intended to become teachers. By 1975, that number had declined to 6.5 percent (p. 693).

A number of factors contribute to the increased demand for teachers and possible shortages. The Bureau of the Cen-

sus projects that by 1985, the birthrate will increase to 17.1 per 1,000 population from the 14.7 per 1,000 population rate in 1976. This increase of almost 900,000 will account for a substantial number of new teaching positions in the late 1980s. The media continue to emphasize the oversupply of teachers in a few areas. Other potential teachers are discouraged by the low salaries and working conditions in the public schools. Many universities and colleges have experienced declining enrollments in all areas due to the rising cost of higher education (Musemeche and Adams, 1978). Dunathan (1980) agreed that

> as the college-age population decreases in the eighties, so will the supply of new teachers. At the same time, public school enrollments, at a realistic estimate of 2.1 children per family, will rise. Demand for teachers will increase (p. 205).

The implications of the current shortage of industrial arts teachers and the projected shortages of teachers in other areas pose some serious threats to the profession. If qualified teachers are not available, programs will be closed. As John Feirer (1981) stated, "the shortage of teachers may become so severe that it could endanger the total industrial education profession" (p. 6).

Recruitment of Industrial Arts Teachers

After recognizing the serious shortage of industrial arts teachers and the declining enrollments in college and university teacher training programs, the profession began to consid-

er recruitment strategies to increase the numbers in its ranks. Recruitment has been a continuous process, but one that has had little or no coordination at a national level. Editorials, such as those by Feirer (1962) and Boyd (1966), appeared in national publications to make the profession aware of the need for recruitment. Spence (1967) stated:

> An organized nationwide program of recruitment of young people to enter our profession is essential. We cannot sit back on our campuses or in our public high schools and wait for intelligent young men and women to choose industrial arts teaching as a career (p. 48).

Despite the lack of nationwide coordination, a number of common recruitment practices and strategies have been identified and implemented. A dissertation by Foley (1967) led to the development of a Handbook on Recruitment of Potential Industrial Arts Teachers. According to this study, some of the most effective recruitment practices, as identified by department heads, were:

1. Contacts with industrial arts teachers.
2. High school visits by faculty.
3. Activities of industrial arts majors.
4. Career days and related activities.
5. Project contests.
6. Contacts with high school guidance counselors.

Not all recruitment practices were effective in all industrial arts departments. Foley stated:

> Industrial arts department heads revealed a great diversity of opinion regarding which recruitment practices were most effective in persuading young people to consider preparing for careers in industrial arts teaching. Obviously, something which works well in one situation

> may not be at all effective in another. Many of these practices, however, may be tried with success in colleges and universities not now using them (p. 20).

The Foley study also identified 18 reasons why students choose industrial arts teaching. The following reasons were selected by 20 or more of the 215 student respondents in the study:

1. Personal enjoyment of industrial arts activities (81).
2. Satisfactions expected from teaching (70).
3. Contributions to students (58).
4. Enjoyment of young people (32).
5. Fringe benefits (27).
6. Teaching positions available (25).
7. Employment conditions (22)(p. 54).

The two groups identified as having the most influence on the students career choices were parents (60%) and industrial arts teachers in grades 10-12 (57%). The experiences that influenced students' career choices according to the Foley study were personal interests or hobbies (77%), industrial arts classwork in grades 10-12 (65%) and visits to college industrial arts facilities (60%).

The Foley study and the recruitment practices identified have continued to be the basis for other studies of industrial arts teacher recruitment. Dr. Niel A. Edmunds, of the University of Nebraska at Lincoln, conducted a study on use and perceived effectiveness of various recruitment techniques by department administrators in the Mississippi Valley Industrial Teacher Education Conference. Although the many problems

facing industrial arts education have been addressed at the Mississippi Valley Conference, Edmunds (1980) identified

> the problem of encouraging, recruiting, training and retaining enough qualified people to meet emerging staffing needs in the United States as of great importance to the continued well-being of the profession (p. 17).

His results, as presented at the 66th Annual Meeting of the Mississippi Valley Conference, are summarized in Table 1. From the table, the four most widely used recruitment techniques were contacts with industrial arts teachers, especially alumni, distribution of brochures to high school and community college students, personal letters to interested high school pupils, and high school visits by college industrial arts department faculty. This contrasts with the four techniques ranked highest in overall perceived effectiveness: contacts with industrial arts teachers, especially alumni, college industrial arts students recruiting other college and high school students, college-sponsored industrial arts contests for high school pupils and contacts with own college freshmen and counselors.

In another session at the 66th Mississippi Valley Conference, Bender, Benson, Craft and Edmunds (1979), presented the following recommendations for effective recruiting for each of the identified groups:

Industrial Education teachers in grades 7-12:

1. If females and minorities are not enrolling in all of

Table 1. Rank order by total of the use and effectiveness of recruitment techniques by Mississippi Valley Conference members and by non-Mississippi Valley Conference members

Use Rank Order	Effectiveness Rank Order	Methods of Recruitment	Mississippi Valley Conference Member Use Rank Order	Mississippi Valley Conference Member Effectiveness Rank Order	Non-Mississippi Valley Conference Member Use Rank Order	Non-Mississippi Valley Conference Member Effectiveness Rank Order
1	1	Contacts with industrial arts teachers, especially alumni.	1	1	1	3
2	16	Distribution of brochures to high school and community college students.	2	13	4	17
3	8	Personal letters to interested high school pupils.	3-4	12	2-3	5-6
4	6	High school visits by college industrial arts department faculty.	5-6	7	2-3	5-6
5-6	9	College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.	7	9-10	6-7	8
5-6	12	Contacts with high school supervisors and administrators through student teaching programs.	3-4	9-10	8-9	14
7	2	College industrial arts students recruiting other college and high school students	11	4	5	1
8	19	Contacts with high school guidance counselors.	8-9-10	19	6-7	19

Table 1. (Continued)

Use Rank Order	Effectiveness Rank Order	Methods of Recruitment	Mississippi Valley Conference Member Use Rank Order	Mississippi Valley Conference Member Effectiveness Rank Order	Non-Mississippi Valley Conference Member Use Rank Order	Non-Mississippi Valley Conference Member Effectiveness Rank Order
9	4	Contacts with own college freshmen and counselors.	8-9-10	2-3	10	7
10	13	Career days, open house, or conference activities for high school pupils on campus.	5-6	16	14-15-16	10
11	7	Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.	14-15	6	8-9	9
12	5	College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.	8-9-10	8	14-15-16	4
13	17	Filmed presentation (slides and tape recorder) of the departmental offerings.	14-15	15	11-12	17
14	14-15	College-paid recruiters traveling the state and country.	13	14	13	15
15	11	Scholarships for industrial arts college programs.	12	11	17	12

Table 1. (Continued)

Use Rank Order	Effectiveness Rank Order	Methods of Recruitment	Mississippi Valley Conference Member Use Rank Order	Mississippi Valley Conference Member Effectiveness Rank Order	Non-Mississippi Valley Conference Member Use Rank Order	Non-Mississippi Valley Conference Member Effectiveness Rank Order
16	10	Community college visits by college industrial arts department faculty.	16	5	16	13
17	3	College-sponsored industrial arts contests for high school pupils.	17	2-3	11-12	2
18	14-15	Industrial arts teachers association bringing secondary school pupils to visit the college.	18	18	18	11
19	18	College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.	19	17	19	18

the industrial education subjects you are teaching, uncover and work to remove the barriers that are preventing their enrollment.
2. Don't be satisfied with recruiting students for industrial education and technology college programs in general, recruit at least one or two each year specifically for industrial teaching.
3. Follow-up on those you have recruited after they go to college giving them encouragement to continue in their pursuit of a teaching career.
4. Obtain recruitment materials from professional organizations and institutions of higher education and make them available to parents, as well as the students, (not just industrial education students) keeping in mind that females may need these materials earlier than males.
5. Above all, continue to improve your program to the point where you are attracting your share of those students who are college bound.

Industrial Education Teacher Educators:

1. Recruit on campus. If possible offer a course in the general curriculum that will appeal as an elective to non-majors. Make recruitment materials available to undecided students.
2. Acknowledge and reward those high school teachers who are good recruiters with a free course, football tickets, a letter of appreciation, certificate, or gift (Ressler, 1967).
3. Offer a special beginning course for women who wish to major in industrial education to help them overcome the lack of previous technical experience they have been denied (Aagaard, 1975).
4. Increase the number of visits your faculty make to high schools to recruit potential industrial education majors.
5. Keep high school teachers well supplied with recruitment materials.

Industrial Education Professional Groups:

1. Develop recruitment materials--especially those for presentation on television and radio.
2. Offer scholarships for students with high potential who have made a decision to pursue a career in industrial arts education (pp. 9-10).

Craft (1980) published the same recommendations and review of recruitment literature in Man/Society/Technology. Edmunds (1980) identified motivational factors for teaching,

student retention, teacher mobility and teacher attitudes as factors to be considered in industrial arts teacher recruitment.

A number of other studies have also identified factors to be considered and made recommendations for improving recruitment. Jahrman (1964) recommended recruiting be oriented toward the interests of students rather than their lack of knowledge of industrial arts teaching. Harris (1968) reported on a program for orienting high school seniors as prospective industrial arts teachers. Eleven students from the 24 student experimental group enrolled in college industrial arts programs as opposed to three students from the control group majoring in industrial arts. The major drawback to this successful program was the high cost per student. Decker (1967) offered the following solutions to the recruitment and teacher supply problem:

> 1. Interest more college-bound students in industrial arts and in industrial arts teaching as a career.
> 2. Provide financial assistance at the undergraduate level to talented students in industrial arts education....
>
> These goals can be accomplished by:
>
> 1. Making industrial arts teaching a status career....
> 2. Making industrial arts teaching an intellectually stimulating career....
> 3. Making an industrial arts teaching career within the reach of all qualified and interested students... (p. 35).

Winegar (1980) urged industrial arts teacher educators to consider how effective they were in teacher recruitment.

The industrial arts classroom teacher has been identified as the most influential person in affecting a career choice

in industrial arts teaching as reported by Boyd (1966), Ressler (1966), Erickson and Suess (1968) and Craft (1980). In a follow-up article to his dissertation, Ressler (1967), encouraged the profession to offer teachers who were effective recruiters incentives and recognition for their efforts. A study by Jenkins (1975), identified teachers in general as the third most influential group affecting career decision making. Specifically, industrial arts teachers were considered influential by a minority of students.

A study by DeVier (1981) assessing the status of industrial arts teacher recruitment in the State of Ohio revealed that enrollment in teacher education programs had dropped even though teacher demand remained high. There was no total recruitment effort in the state, no uniformity of recruitment techniques among the eight college-level industrial arts programs and only limited exposure of recruitment practices to students.

In any recruitment program, communication has been considered an essential element. Weir (1970) compared the effectiveness of different printed media in recruiting undecided students into industrial arts programs. He concluded that a newsletter with current and more personal information was more effective than folders or no media. Miller (1981), in an article on communications strategies for recruitment said that "Good communication for recruitment means letting everyone

know about your plans and activities" (p. 29). She recommended that long-range recruitment plans be developed with communication strategies for internal and external audiences identified.

Minority groups have been the target populations for various recruitment techniques and research studies. Goto (1977), in a study of the problems in recruiting minority people into industrial arts in six western states, concluded that the number of minority teachers in the field was increasing. He recommended a cooperative effort between junior and senior high teachers and college and university personnel in recruiting minority students. In a study on recruiting women in industrial arts, Aagaard (1975) identified radio and television media as the most effective recruiting techniques and posters, bulletin boards and information from other students as least effective. Parents, guardians or relatives were ranked the highest in personal influence. Sixty-eight percent of the students and 65 percent of the teachers surveyed said that industrial arts was not their first choice as a college major. Both female students and teachers felt that the opportune time for recruitment was at the secondary or junior college level. Aagaard recommended having women actively involved in recruitment programs and beginning the recruitment process at an earlier level.

The literature on industrial arts teacher recruitment has identified a variety of techniques, target populations and planned programs aimed at increasing the number of teachers in the profession and lessening the severe nationwide shortage. No nationally coordinated recruitment effort has been developed, but a number of successful regional programs should be considered by institutions not actively recruiting.

Women in Industrial Arts

Women have been playing an ever-expanding role in the industrial arts profession. From the early female-only home mechanics courses to the hiring of female faculty members at colleges and universities, women have been participating in industrial arts in increasing numbers at all levels.

In the 1960s, industrial arts and home economics classes were sexually segregated. There were some industrial arts teachers who were concerned with women and their place in industrial arts. Patterson (1975) theorized that so few women were taking industrial arts courses because of tradition and administrative reasons. The U.S. Office of Education estimated there were 84,000 girls in industrial arts classes in 1962-63 (Brame, 1968). Patterson also realized the need for technological literacy and the changing role of women in society. He stated "Girls must be helped early in their teens to prepare them for the dual role of homemakers and workers...only as

meaningful choices are made early will girls be able to realize their fullest potential in both spheres" (p. 32).

In some schools, girls were taking industrial arts, but this was only a one or two week switch from their home economics classes (Strother, 1969). In an article in School and Community, Brame (1968) stated "We should not continue to discriminate against girls in junior high industrial arts offerings" (p. 23). In the same article, Stark was quoted from the October 1967 Pennsylvania School Journal concerning girls in industrial arts: "They acquire skills and interest quickly, possess the dexterity, intelligence and patience needed to master course content and in many cases they outperform boys in certain types of industrial skills" (p. 23).

With the passage of Title IX in 1972, schools were required to open all programs to both boys and girls. This has resulted in the development of coeducational exploratory industrial arts courses especially at the middle school-junior high level. The objectives of one such program, Exploratory Technology (ET), were explained by Phillips (1978):

> The concepts emphasized in ET include: the importance and place of technology in our world; following directions; safety; consumer education; manipulative skills; problem solving; computing and comparing costs; applying mathematical and scientific knowledge; fabricating finished items from raw materials; careers in technology; creative expression; the use of leisure time; and energy management.
>
> There are still home economics and industrial arts segments of ET, but students are required to take 10 weeks

> of each segment each year. Each course...maintains more consistent learning and a unified department (p. 69).

The 7th, 8th and 9th grade Discovery Program in the Syosset, New York School district provided both boys and girls with experiences in industrial technology and home economics (Simpson, 1978).

Not only were women taking industrial arts at the middle school-junior high level, an increasing number were participating at the senior high and university level. The realization that industrial arts at the secondary level can help meet the needs of women in a changing society opened these courses as electives. In an article by Chickura (1971) on the West Hempstead, New York schools, she said "Most significantly, girls have been placed in regular industrial arts classes; we have not created special classes for them" (p. 33). Even though the goals of the industrial arts profession have been to provide opportunities for all students to learn about the industrial-technical society in which they live, Good (1974) questioned why there is such a discrepancy between the goals and the low percentage of females in industrial arts courses. She stated:

> All educators, including industrial arts teachers, must learn to disregard societal expectations for either sex and become sensitive in dealing with each student as an individual.... Industrial arts teachers can help by offering an exciting relevant program that reflects current industrial and technological trends and considers the needs of all students. If they encourage girls to explore industrial interests and aptitudes through

> industrial arts courses and then treat them exactly the same as boys without pampering or putting them down in the classroom, work with guidance personnel to make sure girls are welcome and have a place in the industrial arts program, and work with the community to provide the best possible educational experiences for students at all levels, the young girls will be active participants in the industrial arts program (p. 100).

On working with guidance counselors to promote equal opportunity for all students in industrial arts Mangano and Patterson (1976) offered the following recommendations:

1. That counselors and industrial arts teachers work cooperatively to help achieve equal opportunity in industrial arts experiences.
2. That counselors and industrial arts teachers re-examine their roles and address themselves to shared goals.
3. That counselors and industrial arts teachers develop strategies for implementing equal opportunity in all areas; and
4. That cooperative career development programs be initiated in which counselors and industrial arts personnel design nonsexist occupational awareness experiences (pp. 113-114).

Patterson (1974) offered suggestions for preparing a slide show to increase the awareness of an entire school on the opportunities available in industrial arts.

Survey data from the standards for Industrial Arts Project as reported by Young and Holmes (1980) indicated that not only were more women enrolling in industrial arts courses, they were enrolling in a greater variety of courses. While there were decreases in some courses, such as home mechanics and textiles, there were increases in the percentage of females enrolled in general woods, general industrial arts and drafting. The courses that had the greatest percentage of

facturing, fluid power, plastics and crafts. A majority of principals indicated that females were "moderately encouraged" to enroll in industrial arts courses and 65 percent of those responding said that recruitment activities for females had been done by the industrial arts faculty over the past five years.

A study at the University of Wisconsin--Stout (1978) on "Women's Attitudes Toward Industrial Education" found significant differences between the mean survey scores of males and females on the attitude section and also for the total score. Women in schools with conservative and traditional industrial education programs scored significantly lower on the attitude section and were less positive toward industrial education than women from schools with compulsary, open enrollment and innovative programs. According to the final report "It must be recognized that simply allowing women to enroll in industrial education courses may not be enough of a change to bring about the needed balance of women and men students in this area" (p. 4). Once barriers have been identified and their importance determined, they can be dealt with directly or compensations made.

Sexism and sex-role stereotyping have been identified as barriers to women in industrial arts. According to Eliason (1977):

> This maleness of technical education and occupation is not viewed with alarm by most men, a large number of edu-

> cators and far too many women. Indeed, it is difficult to achieve general agreement that it constitutes a problem. Those who do view it as a problem, see it, for the most parts, only in terms of personal fulfillment (p. 13).

John Feirer (1975) in an editorial in Industrial Education, urged teachers and administrators to "treat everyone with equal respect, dignity and seriousness as far as their job or career goals are concerned" (p. 15).

Despite these barriers, women have and will continue to become certified industrial arts teachers. Overcoming these barriers as a female student in a university level industrial arts program was part of an article by Moose (1974). Female industrial arts teachers have also reported how to overcome these barriers. Bohn (1976) stated that avoiding stereotyping and changing attitudes were important in the acceptance of women in industrial arts.

Pinder and Rieber (1980) reported on female industrial arts teachers from the data for the Standards for Industrial Arts project. In 1975-76, 341 fully certified female industrial arts teachers were employed in 30 states. That same year, there were 47,790 fully certified male industrial arts teachers in 41 states. California, Texas, Michigan, Pennsylvania and Florida employed the greatest number of fully-certified female teachers. For 1976-77, there were 433 fully certified female and 46,090 male industrial arts teachers in 41 states. Seven of these states employed no female indus-

trial arts teachers. A study by Baron (1974) revealed that liking to work with their hands, interest in working with children and personal interest were factors that influenced women to become industrial arts teachers.

In order to increase the number of women participating in industrial arts at all levels, it is important to increase the number of women teaching in the field. According to Bjorkquist (1973):

> It is time for industrial education, a field generally offered for men only, to reevaluate its place in the education of women.... A key factor in sustaining the move of female students into industrial education classes is the increase of the number of women teachers in the field. This will require effort on the part of teacher education institutions to recruit women students, and it will need to have the support of teachers in secondary schools. As their numbers increase, let's not stereotype women industrial education teachers as teachers of young children, but give them the same opportunities of choice as men in the field (pp. 5, 62).

Anderson (1976), in a presentation at the American Industrial Arts Association Conference in Des Moines, agreed:

> A new population base is provided by women for industrial arts, but the rate at which we attract girls to industrial arts is almost in direct proportion to the number of women who can be attracted to teaching industrial arts (p. 542).

Patterson and Mangano (1976) identified the following points for consideration when encouraging women in industrial education:

1. The philosophy of industrial arts must emphasize its equality and openness--just as general education must be available to everyone.
2. Advertise a program for women with posters, newspaper articles, speakers, PTA programs and contests.

3. Encourage the study of sex bias, both as in-service for teachers and as course material for students.
4. Industrial arts teachers should work with guidance and counseling staff to help them to structure counseling of girls and young women.
5. Pay special attention to the needs of disadvantaged girls and women.
6. Colleges and universities should actively recruit women to enter undergraduate and graduate study in industrial arts, and should encourage them to major in non-traditional areas.
7. Colleges and universities should find and recruit qualified women for their industrial arts faculties, to eliminate discrimination and to provide role models for other women.
8. Industrial arts educators should make themselves aware of new federal programs and legislation affecting women (p. 21).

Women have been participating in ever-expanding roles in the industrial arts profession. Barriers to female participation in industrial arts at all levels are gradually being overcome. Through articles in national publications and presentations at state and national conferences, male members of the profession are becoming more cognizant of the potential for women in industrial arts.

Recruiting Women in Other Areas

Successful recruitment projects have been developed and implemented that have increased the number of women in engineering and technical programs. The traditional male-dominance and technical nature of these programs are similar to industrial arts. Some of the strategies from the following programs should be considered when designing a recruitment model for women in industrial arts.

A report by Seltz-Petrash (1980) in Occupational Outlook Quarterly indicated that the number of women in engineering schools has increased by 300 percent since 1971. Women represented 10 to 25 percent of the total enrollment in engineering programs. Only 2.7 percent of the nation's 1.25 million engineers were women.

The article also included recruitment strategies at Georgia Tech and Michigan Technical University. Enrollment of women at Georgia Tech had increased from 100 in 1972 to 1,200 in 1978. By working with other colleges in the area on a cooperative 5-year program, students spent 3 years majoring in science at another college and 2 years at Georgia Tech in engineering. They graduated with degrees in science and engineering. Georgia Tech also recruited students from high school. Women and minority student National Merit Scholarship winners were mailed information about engineering and the school along with the name of an engineer in his/her area. At Michigan Tech, high school science and math teachers recommended female students for a 5 day summer orientation program. Almost 2/3 of the women who participated in this program enrolled as engineering majors (pp. 14-15).

A study by Sproule and Mathis (1976) identified eight major categories of proven techniques for recruiting women in engineering. These were:

1. Make a commitment to recruit and keep women engineer-

engineering students. This involves appointing coordinators and committees and allocating funds.
2. Publicize your engineering program to prospective women students.
3. Recruit prospective women students at the high school level.
4. Counsel women students after they arrive on campus.
5. Establish a student section of the Society of Women Engineers.
6. Hire women faculty and administrators.
7. Recognize outstanding women students.
8. Publicize opportunities for engineering graduates (pp. 745-748).

The Society of Women Engineers has been instrumental in promoting the need for engineers and the potential for women in these positions. According to Moskowitz (1979):

> To encourage women to pursue careers in engineering, SWE tries to inform young women, their parents, school counselors and the general public of the qualifications and achievements of women engineers and the opportunities available to them.... Women will be inspired to become engineers only when they have role models to emulate. For this reason, SWE members speak to student audiences from the junior high level up (p. 63).

Programs have been developed to recruit women into male-dominated vocational-technical areas at both the secondary and post-secondary levels. A study reported by Lewis and others (1976) on ways to increase occupational opportunities for women included interviews with teachers, students, graduates, parparents, administrators and counselors. According to the final report,"One of the strongest impressions that arose from the total study was that the choice of nontraditional programs was not an especially significant event in the lives of the students who were studied" (p. 7). Students in non-traditional programs were more likely to attend a separate vocational

rather than comprehensive high school. These students made independent choices to study things of personal interest or to prepare for employment or postsecondary education. The report also included recommendations for counselors, teachers, librarians, students, administrators, printed materials and curriculum to encourage and support non-traditional students in secondary vocational education.

Administrators, teachers students, employers, parents and guidance counselors were also the target population of a study on non-traditional secondary vocational education in the State of Ohio. The purpose of the study was to develop a model for recruitment, retention and placement of female students in traditionally male dominated secondary vocational education programs. The conclusions, as reported by Knight and others (1980) were as follows:

1. When two or more non-traditional students are enrolled in a vocational program, the rate of retention is improved.
2. Teacher attitude is critical to class acceptance of students in non-traditional programs.
3. Prior experience in the field is a contributing factor to female enrollment.
4. Role models are a significant factor in the success of female students in non-traditional programs.
5. Audio-visual, instructional and orientation materials that include representations of females are useful in the recruitment, retention and placement of female students in non-traditional programs.
6. Support sessions give visibility to non-traditional students (p. 14).

Increasing career awareness of women and educators was the purpose of the Technical Careers: Pathways to the Future

gram sponsored by Wentworth Institute of Technology and the Boston Globe. Two groups, guidance counselors, math and science teachers and young women (especially junior and early high school age), were exposed to technical careers through a program that included work stations, general sessions, panels, workshops and seminars and information booths. Rudnick and Wallach (1980) reported this was only one method of making girls aware of the career options available to them.

A number of guides and handbooks designed to recruit and employ women in non-traditional areas have been published. The director of a Women's Apprenticeship Program in San Francisco, in Working for You: A Guide to Employing Women in Nontraditional Jobs (1979) suggested that "When you're recruiting for a woman, when you're seriously looking for a woman, you have to look at what you did before and then you've got to change it and gear it toward the group that you're trying to reach" (p. 9).

The Association of American Colleges, in it's handbook on Recruiting Women for Traditionally "Male" Careers (1977), suggested special programs such as conferences, workshops, summer programs, residency and re-entry programs, and special materials such as booklets, posters, and publications that reach alumni be used for recruitment. Existing promotional materials should be reviewed and revised to include bias free language,

language, pictures of women in active roles and statements of assurance of compliance with federal law prohibiting sex discrimination. The handbook also identified other resources for recruiting women in medicine and health fields, law, engineering and science.

Mintz (1976) developed a model for recruiting mature women into traditionally male-oriented occupational education programs. Women in Nontraditional Jobs: A Program Model (1978) was implemented in Boston to expand and improve the occupational options of low income women in the skilled trades of building maintenance. Weitz and Gilmour (1978) reported on a program to increase the number of women in the machine operator training program at the Williamsport Area Community College in Williamsport, Pennsylvania. One method for increasing the number of female students in non-traditional areas has been to increase the number of non-traditional teachers that serve as role models. Cobble (1980) developed a handbook for recruiting and training journey women as part-time trade teachers.

One exemplary recruitment project in vocational education was the FACET (Female Access to Careers in Engineering Technology) program at Trident Technical College in South Carolina. According to Caughman (1978) in the final report, the success of the program was based on a public awareness campaign, specialized recruiting and testing, a su-mer quarter of pre-engineering for selected high school women and orienting the

faculty to the special problems and potentials of women students. The target groups for recruitment were girls still in school and women out of school for one or more years. Once in the program, the women participated in support groups that met monthly. The support groups provided encouragement for the women to continue in the program even though individual and societal factors discouraged career development in technical programs.

An article in the American Vocational Journal, 1977, summarized comments by Dr. Alan Sheppard on vocational education for the elderly and Dr. Florence Mintz on vocational education for women made at the American Vocational Association convention in Houston in 1976. In her opening remarks, Dr. Mintz stated that "unless wholesale changes are made in the entire recruitment process, vocational education cannot expect to make any substantial progress in career options for women" (p. 68).

A number of common recruitment practices have been implemented in both engineering and vocational-technical education. The primary factor for success is that a commitment be made to increase the number of women in a non-traditional program and a number of groups, such as students, teachers, administrators, counselors and parents, be actively involved in the program. Once recruited into a program, some type of support group will encourage a woman to complete the program.

Career Development of Women

Basic theories of career development, such as those proposed by Roe (1956), Super (1957), Holland (1966), Ginzberg, Ginsburg, Axelrad and Herma (1951) and Tiedeman and O'Hara (1963), have been based on data obtained from studies of males. Research on the career development of females has been inconclusive. According to Osipow (1973):

> The most apt way to summarize current understandings about the career development of women is to make several assertations. First, the study of women's careers is a highly timely endeavor. Second, there are data which indicate that women's careers are not substantially different from men's and at the same time, data exist suggesting just the opposite conclusion.... A third and final assertion that might be made about women's careers is that so much social change is now occurring in the area of sex and vocation that any theoretical proposal made now is likely to be premature, as is any generalization about women's career development (pp. 264-265).

Early theories of career development of women, such as those by Super (1957) and Zytowski (1969), were based on the assumption that a woman's primary role was that of homemaker and childbearer. These theories were the basis for other research in the 1960s and early 1970s. Tyler (1964) identified two contrasting life orientations for girls. She concluded that:

> Girls who do not accept the traditional concepts with regard to sex roles during the preschool years are more likely to develop career (as opposed to the traditional female) interest than those who do accept them at 6 or younger. It is <u>early</u> masculinity of interests, not masculinity at later ages, that is related to the development of this particular pattern (p. 212).

A study by Astin (1968) supported Tyler's concept of earlier masculine orientation. From her research on high school girls, Austin suggested that girls develop post-high school vocational plans in terms of career and noncareer orientations. She recommended research on earlier developmental periods.

A theory of occupational choice for women proposed by Psathas (1968) considered the "setting" in which career decisions are made. Factors identified as part of the setting were marriage, family finances, mobility, education and occupation of parents and values. Hawley (1971) investigated women's perceptions of how men viewed career and traditionally female oriented women. Women in traditionally feminine occupations perceived men as viewing appropriate behavior as male or female while women in the career group did not. She also concluded that the known theories of career development may not be applicable to women because the career development process for women begins earlier than for men. Moss (1978) found that women's perceptions of other's opinions about career and traditional orientations did not influence what careers they choose. Instead it affected how they choose to implement their career in their life pattern.

Starting in the mid-1970s, with the implementation of Title IX, the changing labor force and the expanding roles of women in society, research in career development began to study sex-role stereotyping and the dual role of women. Osipow

(1976), in a review of the research on sex roles and career development for 1975, summarized that "sex-role stereotyping still continues, although there is some evidence to suggest a moderation is occurring" (p. 133). Garbin and Stover (1980) summarized the research in sex roles for 1979 by stating:

> These studies demonstrate that cultural prescriptions of job appropriateness for both males and females are still heavily entrenched in our society. They obviously act as major constraints upon decision-making in the vocational area (p. 132).

To overcome the effects of sex-role stereotyping, research has shown the importance of role models at various stages of career development. Basow and Howe (1980) defined a role model in their study as "someone whose life and activities influenced the respondent in specific life decisions" (p. 559). This could be either positive or negative influence. Their research indicated that females were influenced more by female models than males. Both males and females were equally influenced by male role models. They suggested that females in certain career positions may be especially important role models for younger females.

Combs and Tolbert (1980) identified the vocational role models of college women seniors and graduate students. The senior women identified working persons other than teacher or professor, their mothers and peers as most influential while the female graduate students chose teachers and professors, working persons and mothers. According to the authors:

> The modeling process is based on the ability to imagine the kind of person one wants to become and then using other people's lives as a guide to personal development. The process changes over a period of time as the individual's vocational identity becomes differentiated (pp. 34-35).

This study also revealed the importance of female role models who were able to successfully combine career and marriage. Although some college women were able to strive for success in male-dominated fields because they were in the minority, for most college women in male-dominated fields, the lack of female role models was an obstacle to their career goals. Students should have the opportunity for direct involvement with non-traditional female role models. This supported the need for role models as reported by Walsh (1979).

Bolton (1980) and Combs and Tolbert (1980) established the importance of the mentor relationship in the role modeling process. Bolton identified role models as particularly important in the career development of women. The mentor is identified as an expanded, more specific role model. In defining the mentor, Bolton stated:

> The mentor, like the role model, demonstrates how an activity is to be performed and can enhance the learning experience. In addition the mentor personalizes the modeling influences for the individual by a direct involvement not necessarily implied by a role model. Thus in addition to being a role model, the mentor acts as a guide, a tutor or coach, and a confidant.... In regard to the absence of appropriate occupational role models for women, it is especially important that women consider becoming mentors for other women (pp. 198-204).

The implications of career development of women theories

for counselors were identified by Sauter, Seidl and Karbon (1980) and Hansen (1977). Hansen suggested the following strategies to assist counselors and teachers in developing positive career attitudes in women:

1. We need to become aware of our own conscious and nonconscious attitudes, expectations, and practices in the counseling interview....
2. We need to become increasingly aware of sex bias in guidance materials, tests and inventories and our own bias in interpreting and using those materials....
3. We need to know and help clients obtain accurate information about trends both in the world of work and in the larger society....
4. We need to help young men and women become increasingly aware of the options available to them in a pluralistic society--in education, occupation, life styles and career patterns....
5. We need to help young men and women learn the processes involved in decision making....
6. We need to provide female clients with a variety of role models with whom they can identify and from whom they can learn that multiple roles are possible, desirable, and real....
7. We need to involve parents more systematically and develop mentally in the career development processes of boys and girls (pp. 462-465).

When discussing career development specifically for teachers, it is important to identify when people decide to teach. A study by Riccio (1961) identified the mean age as 15.08 years for females and 17.5 years for males. He concluded:

> The statistics cited in the preceding paragraph suggest that whereas girls might well be recruited into teaching in the junior high school and high school years, boys are more susceptible to a commitment to teaching in the latter part of their high school years and in their early years in college. These factors should receive strong consideration in any concentrated effort to recruit teachers (p. 95).

A study by Page, Page, Hawk and Lindsey (1981) concurred with the previous research. Forty percent of the high school seniors who were interested in a teaching career had chosen teaching before age 15. Forty percent were interested at age 15 or 16 and twenty percent developed an interest at age 17 or 18.

Research in the career development of women has been inconclusive. There have been no specific theories developed but a number of common generalizations have been identified. The career development process for females begins earlier than for males. The positive relationship with role models and mentors, especially women who have successfully combined career and marriage, must be developed if women are to pursue non-traditional careers. Women who choose teaching as a career generally make this decision earlier than men.

Changing social and economic forces will continue to influence the role of women in society and research in career development.

Summary

This review of literature has cited a number of sources that indicate the industrial arts profession is facing critical shortages of teachers, a trend that is expected to continue into the future. Various studies on recruitment have identified successful strategies for influencing people to choose in-

dustrial arts teaching as a career. Despite these efforts, significant increases in the number of industrial arts teachers have not occurred. Other target populations, such as women and minorities, have been identified as potential industrial arts teachers.

Women have been involved in industrial arts at all levels since its evolution from manual arts. The number of women in industrial arts courses at the elementary, junior and senior high and college levels is increasing. Research has indicated the number of female industrial arts teachers is also increasing. Still, women are a very small percentage, less than 1 percent, of the total industrial arts teacher population.

A number of successful recruitment strategies have been implemented in engineering and technical programs to increase the number of women in these areas. With the non-traditional similarity to industrial arts, these recruitment practices have potential for increasing the number of female industrial arts teachers.

When designing a recruitment program in industrial arts, it is essential to consider the career development of women. Research indicates women make their career choices earlier than men. Teachers, in general, make career choices earlier than other occupational groups. Women in non-traditional areas need role models and mentors to identify with and for support.

There is the need for increasing the number of female industrial arts teachers at the junior and senior high levels to provide positive role models for female students considering teaching. According to the research, they may be more effective at the junior high and early senior high levels. The development of a recruitment model can help increase the number of female industrial arts teachers and also build a base for recruitment in the future.

CHAPTER III. METHODS AND PROCEDURES

This chapter contains a discussion of the methods and procedures used in the development of the model for recruiting women in industrial arts. The methods and procedures used in collecting background information on female industrial arts teachers and identifying target populations for recruitment are also included. The chapter is divided into four major sections: 1) instrument development, evaluation and revision; 2) identification of target populations for the survey instruments; 3) administration of survey instruments; and 4) data analysis procedures.

Instrument Development, Evaluation and Revision

The initial steps in this study were the development; evaluation and revision of the survey instruments that provided the data for the development of the recruitment model presented in Chapter V. Three different survey instruments were developed.

Graduates and Enrollments in Industrial Education

Tne first instrument was used to identify those institutions that were the leaders in the recruitment and graduation of women from industrial arts programs. The initial Graduates and Enrollments in Industrial Education instrument requested the total number of graduates from teaching programs, total number of female graduates from teaching programs, total

number of graduates from industry/technology programs and total number of female graduates from industry/technology programs by year for the years 1971-1981. It also requested the current enrollments at the four undergraduate levels in the four categories. Departments were also asked to provide the names, addresses and phone numbers of three female industrial arts teachers. The survey instrument was pilot tested on June 26, 1981 with five randomly selected industrial education departments. The departments were selected from 205 departments listed in the American Industrial Arts Association's Directory of Colleges and Universities Offering Degrees in Industrial Arts.

All five departments responded either by mailing back the survey instrument or answering the questions during a follow-up telephone conversation. The department personnel recommended the survey be revised because they did not have ready access to the total number of graduates in each area for the years 1971-1981.

This finding did not concur with the following assumption of this study:

> Assumption 2 -- Each industrial arts department will have accurate records on the number and sex of graduates over the past 10 years.

The current enrollment figures were easier to obtain, but may

not have been accurate because of the time between the actual enrollment count and the return of the survey.

Following the recommendations of the pilot study, the Graduates and Enrollments in Industrial Education survey was revised. Information on number of graduates was requested for the years 1976-1981. The total number of graduates with bachelor's degrees for each year from each department was provided on the questionnaire. This information was secured from the Industrial Teacher Education Directory. From these numbers, department heads were asked to list the number of female graduates in teaching and female graduates in industry/technology programs for each year. Also requested were current enrollments at the four undergraduate levels. These enrollment figures were reported as total number and number of females in teaching programs and total number and number of females in industry/technology programs. Department heads were asked to provide the names, addresses and phone numbers of three female industrial arts teachers.

This revised survey instrument (Appendix A) was pilot tested on July 28, 1981 with 10 randomly selected departments. They were chosen from the population of institutions that had 10 or less graduates during the 1979-80 fiscal year as listed in the Industrial Teacher Education Directory. Six of the 10 surveys were completed and returned. A follow-up telephone conversation was made to two of the remaining four institu-

tions. Department heads indicated they had little difficulty providing the number of graduates over the past five years and current enrollments. Not all department heads were able to provide the names of three female industrial arts teachers because they could not identify any in their area or had no female graduates. This finding concurred with the following assumption of this study:

> Assumption 1 -- Females graduating with certification to teach industrial arts over the past 20 years represent a very small portion of the total number of industrial arts graduates.

Recruitment questionnaire--industrial education departments

The second questionnaire for the 30 leading institutions in the recruitment and graduation of women dealt with the perceived effectiveness of selected recruitment practices (Appendix C). The 20 recruitment practices were those identified by Foley in the Handbook on Recruitment of Potential Industrial Arts Teachers. DeVier had developed a similar survey instrument for a study of industrial arts teacher recruitment in the State of Ohio.

Department heads were asked to rate the perceived effectiveness of each practice on a scale of 1 to 5 with 1 being totally ineffective to 5 being very effective. In order to de-

termine which practices were actually used, department heads were asked to identify the target population for each practice. This was to determine whether it was primarily for recruiting males, females, both groups or not applicable.

Recruitment questionnaire-female industrial arts teachers

The third questionnaire was developed for female industrial arts teachers (Appendix E). The first part of the survey dealt with background information and how each teacher became interested in industrial arts. Questions for this part of the instrument were developed from research in the area of career development of women. Other sources of questions were studies on industrial arts teacher recruitment, specifically those of Foley and DeVier. The survey was designed so questions could be answered by checking the appropriate response. This ease of completion of questions was designed to encourage teachers to complete and return the survey.

The second part of the questionnaire for female industrial arts teachers was the perceived effectiveness of 20 selected recruitment practices. This was the same as the second survey that went to industrial education department heads. Instead of identifying a target population, teachers were asked to indicate if they had actually experienced a specific recruitment practice.

The survey was pilot tested on September 27, 1981. A

sample of 14 female industrial arts teachers was selected from the pool of female industrial arts teachers identified by industrial education departments. Of this group, 3 were contacted and answered the questionnaire over the telephone. This small sample for the pilot study identified a number of problems in administering the questionnaire. The telephone numbers provided by the departments were not entirely accurate, so there was difficulty contacting the subjects for the pilot study. Because of the length of the questionnaire, the time spent interviewing each individual became a factor. The teachers indicated tnat the second part of the questionnaire would have been much easier and more accurately answered if they could actually see the questions. After pilot testing the questionnaire over the telephone, it was determined it would be more effective to mail the survey to the female industrial arts teachers.

Identification of Target Populations

For the development of the recruitment model, input from industrial education departments and female industrial arts teachers was needed. The departments were those that had graduated more than 10 people from their programs in fiscal year 1979-80 as identified in the Industrial Teacher Education Directory. There were 138 departments in this sample. The target population for the second survey consisted of the 30 leading institutions in the recruitment and graduation of

women as identified from the first survey. The female industrial arts teachers were a random sample of the pool of teachers identified by the departments on the initial survey.

Administration of Survey Instruments

The initial questionnaire, Graduates and Enrollments in Industrial Education, was mailed with cover letter (Appendix B) and stamped, self-addressed return envelope to 138 departments on September 1, 1981. On September 21, 1981, a follow-up postcard was mailed to those departments who had not yet responded. Eighty-four or 61% of this group completed and returned the questionnaire. A sample of the 37 leading departments in the recruitment and graduation of women was identified from the initial survey. On October 1, 1981 they were mailed the Recruitment Questionnaire -- Industrial Education Departments with cover letter (Appendix D) and stamped, self-addressed return envelope. Of this group, 35 or 95% completed and returned the questionnaire. Included in this group were 28 of the 30 leading institutions in the recruitment and graduation of women.

The department heads identified 111 female industrial arts teachers from 33 states. On October 7, 1981, the Recruitment Questionnaire -- Female Industrial Arts teachers with cover letter (Appendix F) and stamped, self-addressed return envelope was mailed to 70 randomly selected teachers. One teacher was

randomly selected from each of the 33 states represented. The remaining teachers were listed alphabetically by state and the 37 other teachers in the sample were selected using a table of random numbers. On November 2, 1981, a follow-up postcard was mailed to those teachers who had not yet responded. A third follow-up letter, including another copy of the recruitment questionnaire, was mailed to the female industrial arts teachers who had yet to respond on December 8, 1981. Sixty percent of this group, 42 of the 70 questionnaires, were returned with items completed. Thirty-seven of the questionnaires had both parts completed while 5 were returned with only the first section on background information completed.

Because a minimum of 50 female industrial arts teachers were needed for the study and the incomplete returns from the first mailing to 70 teachers, a second sample of 25 female industrial arts teachers was identified. On November 16, 1981, they were mailed the Recruitment Questionnaire -- Female Industrial Arts Teachers with cover letter and stamped, self-addressed return envelope. Of this group, 15 of the 25 returned the questionnaire with items completed. Fourteen of the questionnaires had both parts completed while one had only the first section on background information completed.

From both of these samples, 57 of the returned questionnaires had the first part on background information completed. Fifty-one of the questionnaires had the second part on per-

ceived effectiveness of recruitment practices and actual experience completed.

Data Analysis Procedures

The data analysis is presented in relation to the questions of the study.

Question 1 stated:

> What institutions in the United States are leaders in the recruitment and graduation of women in undergraduate industrial arts programs?

The leading institutions were identified by arranging the colleges and universities in order according to the total number of female graduates and enrollments in their industrial arts programs.

Question 2 stated:

> What are successful recruitment strategies for getting women into the industrial arts profession?

To determine the level of agreement among responses of industrial education department personnel and female industrial arts teachers on the perceived effectiveness of the twenty selected recruitment practices, a frequency histogram and Kolmogorov-Smirnov Goodness of Fit test was generated for each question.

The responses for the Perceived Effectiveness of Recruitment Strategies questionnaire were on an ordinal measurement scale. Department heads and female industrial arts

teachers were able to judge the perceived effectiveness of each recruitment practice on a scale from 1 (totally ineffective) to 5 (very effective). The ordinal scale does not tell how much of a difference exists, but only that there is a difference and the order of the perceived effectiveness of the recruitment practices. The median for this part of the questionnaire was 3.

A computer program for the Kolmogorov-Smirnov written in Basic-Plus by Zenon Smolarek (1981) was modified to Basic to be run on an Apple computer. Because of the type of data, a frequency histogram to picture the distribution of responses was generated for each question. The Kolmogorov-Smirnov Goodness of Fit Test was used to test the following hypothesis about sample distribution of responses:

There is no difference in expected proportion of choices for each of the six responses.

HO: $f_1 = f_2 = f_3 = f_4 = f_5 = f_6$

HA: The frequencies f_1, f_2, f_3, f_4, f_5 and f_6 are not equal.

The formulas (Ostle and Mensing, 1975) used in the analysis of this data were as follows:

FT(X)--The completely specified theoretical cumulative distribution function under the null hypotheses.

FO(X)- The sample cumulative distribution function based on n observations. For any observation X, FT(X) = K/T when K is the number of observations less than or equal to X.

D = maximum $|\ FO(X) - FT(X)|$. For $\alpha = .05$, if the observed value of D is greater than or equal to the critical value, $\frac{1.36}{\sqrt{n}}$, the hypothesis will be rejected.

Question 3 stated:

> What are some of the common characteristics of female industrial arts teachers?

The first part of the questionnaire for female industrial arts teachers dealt with their backgrounds and experiences. Standard descriptive statistics were used. This involved calculating means, medians, modes, ranges, frequencies and percentages according to the nature of the question.

Although not stated as a specific research question, the following problem was the primary purpose of this study:

> Problem 4 -- To develop a recruitment model with identified target populations for use by institutions to bring more women into their industrial arts programs.

The model, which is presented in Chapter 5, was developed from input by department heads and female industrial arts teachers in answering Question 2 of this study. Target populations were identified in part by answering Question 3.

The model also presents recommended recruitment strategies that were not included on the recruitment questionnaires. These were recommended by female industrial arts teachers and the author of this study. The recruitment practices are primarily for secondary and post-secondary departments for a cooperative recruitment effort with professional organizations.

CHAPTER IV. FINDINGS

The findings presented in this chapter will be developed in relation to the following questions:

1. What institutions in the United States are leaders in the recruitment and graduation of women in undergraduate industrial arts programs?
2. What are successful recruitment strategies for getting women into the industrial arts profession?
3. What are some of the common characteristics of female industrial arts teachers?

Institutions--Baccalaureate Degrees

The initial question to be answered by this study was:

> What institutions in the United States are leaders in the recruitment and graduation of women in undergraduate industrial arts programs?

The questionnaire, Female Graduates and Enrollments in Industrial Education, was mailed to 138 departments. Of this sample, 84 or 61 percent, completed and returned the questionnaire. The institutions were ranked according to the total number of female graduates and enrollments in teaching. A total of 37 institutions had eight or more female graduates and enrollees. The original question sought to identify the top 30 institutions, but with ties in the total number of

graduates and enrollees considered, 37 institutions were included. The institutions are listed in Table 2. Rank in female graduates and rank in current female enrollment is also included.

The majority of institutions also had female graduates and enrollments in industry and technology programs. The totals are presented in Table 3.

Successful Recruitment Strategies

One of the primary purposes of this study was to identify successful recruitment strategies and if they were being utilized.

Question 2 stated:

> What are successful recruitment strategies for getting women into the industrial arts profession?

Twenty different recruitment practices were identified. A questionnaire on the perceived effectiveness of each recruitment practice was developed for industrial education departments and female industrial arts teachers.

The industrial education departments reported through their department administrators the target population for each recruitment practice. All recruitment practices were used by at least 12 of the departments for the recruitment of both males and females. Table 4 shows the recruitment practices used and their frequency of use for each target population.

Table 2. Female graduates and enrollment in industrial arts teaching programs

Institution	Female graduates in teaching (rank)	Female enrollment in teaching (rank)	Total	Rank
State University College-Oswego, New York	58(1)	39(1)	97	1
Texas A&M University	30(2)	24(2)	54	2
North Carolina State University	18(4)	10(10.5)	28	3
Clemson University-South Carolina	7(22)	17(3)	24	4
Millersville State College-Pennsylvania	10(10.5)	13(5)	23	5
New York University-Washington Square	19(3)	3(31.5)	22	6
University of Wisconsin-Stout	5(27.5)	16(4)	21	7
Central Connecticut State College	8(18)	12(6.5)	20	8.5
East Carolina University-North Carolina	10(10.5)	10(10.5)	20	8.5
California State College-Pennsylvania	11(7.5)	8(20)	19	10
Eastern Kentucky University	15(5)	3(31.5)	18	11
Texas A&I University	8(18)	9(14.5)	17	12
California State University Long Beach	8(18)	8(20)	16	15
Northern Arizona University	5(27.5)	11(8)	16	15
Western Washington University	8(18)	8(20)	16	15
Old Dominion University-Virginia	12(6)	4(28)	16	15
Purdue University-Indiana	6(24)	10(10.5)	16	15
North Texas State University	8(18)	6(26)	14	19
California State University-Chico	5(27.5)	9(14.5)	14	19
University of Maryland	6(24)	8(20)	14	19
Iowa State University	9(13.5)	4(28)	13	22.5
University of Arkansas	10(10.5)	3(31.5)	13	22.5
University of Minnesota Minneapolis	11(7.5)	2(34)	13	22.5

Table 2. (Continued)

Institution	Female graduates in teaching (rank)	Female enrollment in teaching (rank)	Total	Rank
Arizona State University	6(24)	7(24.5)	13	22.5
Middle Tennessee State University	3(31.5)	9(14.5)	12	26
Miami University-Ohio	NA[a]	12(6.5)	12	26
Elizabeth City State University-North Carolina	2(33)	10(10.5)	12	26
Virginia Polytechnic Institute and State University	8(18)	3(31.5)	11	29.5
Eastern Illinois University	3(31.5)	8(20)	11	29.5
Oregon State University	4(30)	7(24.5)	11	29.5
Langston University-Oklahoma	10(10.5)	1(35.5)	11	29.5
Keene State College-New Hampshire	1(34.5)	9(14.5)	10	32
Central Missouri State University	5(27.5)	4(28)	9	34.5
Pennsylvania State University	9(13.5)	0(37)	9	34.5
Ohio Northern University	1(34.5)	8(20)	9	34.5
Eastern Michigan University	8(18)	1(35.5)	9	34.5
University of Southern Colorado	NA[a]	8(20)	8	37

[a]NA-Information not available.

Table 3. Female graduates and enrollment in industry and technology programs

Institution	Female graduates in industry & technology (rank)	Female enrollment in industry & technology (rank)	Total	Rank
University of Wisconsin-Stout	31(2)	146(1)	177	1
Central Missouri State University	34(1)	142(2)	176	2
Arizona State University	7(12.5)	49(4)	56	3
Central Connecticut State College	0(21.5)	50(3)	50	4
California State University-Chico	10(8)	23(7)	33	5.5
Middle Tennessee State University	9(9)	24(6)	33	5.5
Keene State College New Hampshire	3(17)	27(5)	30	7
Clemson University-South Carolina	15(4)	13(13)	28	8
Northern Arizona University	11(6.5)	15(11.5)	26	9
North Texas State University	7(12.5)	18(8)	25	10
Western Washington University	7(12.5)	16(9.5)	23	11.5
University of Maryland	7(12.5)	16(9.5)	23	11.5
Eastern Kentucky University	21(3)	NA[a]	21	13
Langston University-Oklahoma	8(10)	7(15.5)	15	14.5
Elizabeth City State University-North Carolina	0(21.5)	15(11.5)	15	14.5
Eastern Michigan University	13(5)	NA[a]	13	16.5
California State College-Pennsylvania	3(17)	10(14)	13	16.5
East Carolina University-North Carolina	11(6.5)	NA[a]	11	18
Eastern Illinois University	3(17)	6(17)	9	19

[a]NA-Information not available.

Table 3. (Continued)

Institution	Female graduates in industry & technology (rank)	Female enrollment in industry & technology (rank)	Total	Rank
Iowa State University	6(15)	1(20)	7	20.5
Purdue University-Indiana	NA[a]	7(15.5)	7	20.5
Ohio Northern University	2(19.5)	4(18.5)	6	22
New York University-Washington Square	NA[a]	4(18.5)	4	23
University of Arkansas	2(19.5)	NA[a]	2	24

Table 4. Recruitment practice target population, industrial education departments (N=35)

Recruitment Practice	Target Population M (Males)	F (Females)	B (Both)	NA (Not Used)
1. College industrial arts students recruiting other college and high school students.	0	0	31	4
2. Contacts with own college freshmen and counselors.	0	0	31	4
3. High school visits by college industrial arts department faculty.	1	0	28	6
4. Personal letters to interested high school pupils.	0	0	28	7
5. Community college visits by college industrial arts department faculty.	2	0	20	13
6. Contacts with high school supervisors and administrators through student teaching programs.	2	0	30	3
7. Industrial arts teachers association bringing secondary school pupils to visit the college.	1	0	26	8
8. Distribution of brochures to high school and community college students.	0	0	31	4
9. College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.	0	0	15	20

Table 4. (Continued)

Recruitment Practice	Target Population M (Males)	F (Females)	B (Both)	NA (Not Used)
10. Contacts with female industrial arts teachers, especially alumni.	0	3	16	16
11. Contacts with high school guidance counselors.	0	0	28	7
12. Filmed presentation (slides and tape recorder) of the departmental offerings.	0	0	24	11
13. College-paid recruiters traveling the state and country.	1	0	22	12
14. Contacts with male industrial arts teachers, especially alumni.	0	0	30	5
15. College-sponsored industrial arts contests for high school pupils.	0	0	12	23
16. College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.	0	0	29	6
17. Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.	0	0	26	9

Table 4. (Continued)

	Recruitment Practice	Target Population M (Males)	F (Females)	B (Both)	NA (Not Used)
18.	College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.	0	0	27	8
19.	Scholarships for industrial arts college programs.	0	2	15	18
20.	Career days, open house or conference activities.	0	0	30	5

The recruitment practices meeting a criteria of use by at least 75 percent of the industrial education departments for recruiting both males and females were as follows:

-College industrial arts students recruiting other college and high school students.
-Contacts with own college freshmen and counselors.
-High school visits by college industrial arts department faculty.
-Personal letters to interested high school pupils.
-Contacts with high school supervisors and administrators through student teaching programs.
-Distribution of brochures to high school and community college students.
-Contacts with high school guidance counselors.
-Contacts with male industrial arts teachers, especially alumni.
-College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.
-College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.
-Career days, open house or conference activities.

Only seven recruitment practices were used exclusively for the recruitment of students by sex. These recruitment practices received a minimum of one response with the greatest number being three.

The information on effective recruitment practices was completed through an analysis of the department heads responses. The industrial education departments agreed the following were effective recruitment practices:

-College industrial arts students recruiting other college and high school students.
-Contacts with male industrial arts teachers, especially alumni.
-College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.

-Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.

One recruitment practice, career days, open house or conference activities, was perceived as effective although there were a significant number of neutral responses. The industrial education departments agreed on neutral responses for the following recruitment practices:

-Contacts with own college freshmen and counselors.
-Contacts with high school supervisors and administrators through student teaching programs.

Three other recruitment strategies were agreed on because of no response on the questionnaire. These were:

-College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.
-College-sponsored industrial arts contests for high school pupils.
-Scholarships for industrial arts college programs (Appendix I).

The 20 recruitment practices were included on the Recruitment Questionnaire-Female Industrial Arts Teachers sent to female industrial arts teachers. Seventy-six percent of the respondents had not actually experienced the recruitment practices. The recruitment practices that were experienced by the highest number of female industrial arts teachers are presented in Table 5.

The information on effective recruitment practices was completed through an analysis of the female industrial arts teacher's responses. The teachers agreed college-sponsored

Table 5. Recruitment practice actual experience-female industrial arts teachers

	Recruitment practice	Number of teachers	Percent
1.	College industrial arts students recruiting other college and high school students.	12	24
2.	Contacts with male industrial arts teachers, especially alumni.	11	22
3.	Contacts with own college freshmen and counselors.	10	20
4.	Contacts with high school supervisors and administrators through student teaching programs.	10	20
5.	College-sponsored industrial arts contests for high school pupils.	10	20
6.	College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors (Appendix H).	9	18

industrial arts contests for high school pupils was a very effective recruitment practice. The teachers agreed the following were effective recruitment practices:

-College industrial arts students recruiting other college and high school students.
-Industrial arts teachers association bringing secondary school pupils to visit the college.
-Contacts with female industrial arts teachers, especially alumni.
-Contacts with male industrial arts teachers especially alumni.
-College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.
-Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.
-Scholarships for industrial arts college programs.
-Career days, open house or conference activities.

The teachers agreed that community college visits by college industrial arts department faculty and filmed presentation (slides and tape recorder) of the departmental offerings were effective, but there were a number of neutral responses. The teachers agreed on neutral responses for the following strategies:

-Distribution of brochures to high school and community college students.
-College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors (Appendix J).

Both the industrial education departments and female industrial arts teachers agreed the following were effective recruitment strategies:

-College industrial arts students recruiting other college and high school students.
-Contacts with male industrial arts teachers, especially alumni.
-College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.
-Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.

Characteristics of Female Industrial Arts Teachers

An important step in the development of the recruitment model was to determine the following:

What are some of the common characteristics of female industrial arts teachers?

Demographic data

The characteristics identified were those of 57 randomly selected female industrial arts teachers. The teachers were chosen from the pool of 111 female industrial arts teachers identified by department heads on the initial questionnaire of this study. Twenty-seven states were represented in this sample. Seven of the teachers were from Texas with six from Pennsylvania and five from Missouri. Georgia, New Jersey, New York, Oklahoma and Virginia each had three teachers in the sample. Connecticut, Florida, Maryland, Oregon and South Carolina each had two teachers in the sample. The remaining 14 states each had one teacher (Appendix K).

The teachers ranged in age from 21 to 60 with a mean age of 27.34 years and standard deviation = 13.6. Forty of the 57 teachers were in their twenties.

Professional experience

The women in this study had teaching experience in industrial arts that ranged from student teaching to 16 years. Fifteen had three years of experience while 12 had one year of experience. The mean number of years of industrial arts teaching experience was 3.79 years and standard deviation = 3.73.

The majority of the teachers, 37, taught at the senior high level. Twenty-seven taught at the junior high level while seven taught at the middle school and five at the post-secondary level.

The production cluster had the highest number of women in this study currently teaching or with teaching experience. This included building trades, woods, metals, plastics, ceramics and manufacturing. There were a total of 101 individual responses in these areas. The total is greater than 57 because some of the teachers were teaching or had taught in more than one area of the production cluster. The communication cluster of drafting, design and graphic communications had a total of 74 individuals with experience in these areas. The energy and power/transportation cluster

Table 6. Teaching experience-female industrial arts teachers

Number of years	Respondents
Less than 1 year[a]	6
1	12
2	5
3	15
4	6
5	1
6	2
7	1
8	2
9	0
10	2
11	1
12	2
13	0
14	1
15	0
16	1

[a]Student teaching.

that included auto mechanics, power mechanics and electricity/electronics had a total of 14 individuals. Fourteen of the teachers indicated they had taught general exploratory programs. Twenty-three other areas were also identified as being taught by the female industrial arts teachers. These totals are broken down in Table 7.

Educational experience

An important part of the identification of characteristics of female industrial arts teachers dealt with their

Table 7. Female industrial arts teachers-areas taught

Area	Number
Auto	1
Building trades	7
Power mechanics	7
Energy power/transportation	7
Drafting	32
Design	12
Electricity/electronics	8
Graphic communications	30
Woods	33
Metals	24
Plastics	17
Manufacturing	9
Welding	11
General exploratory	14
Other:	23
Crafts	3
Home maintenance	3
Photography	3
Ceramics	2
Leatherworking	2
Industrial crafts	2
Stagecraft	1
Commercial art	1
Career education	1
Upholstery	1
Basic car care	1
Occupational versatility	1
Remedial math	1
Communications technology	1

educational background. Fifty-four of the teachers graduated from public high schools while three graduated from private high schools. Size of graduating class ranged as follows:

Table 8. Female industrial arts teachers-size of high school graduating class

Number of students	Number of teachers	Percent
Less than 50	4	7
51-100	10	18
101-200	6	10
201-500	21	37
Over 500	16	28
	57	100

The teachers indicated they had undergraduate and graduate degrees in the following areas:

Table 9. Female industrial arts teachers-undergraduate and graduate degrees

	Degree	Number of teachers	Percent
1.	Bachelors-industrial arts or industrial education	51	90
2.	Bachelors-recreation	2	4
3.	Bachelors-education	1	2
4.	Bachelors-graphic design	1	2
5.	Bachelors-art	1	2
6.	Bachelors-physical education	1	2
7.	Bachelors-fine arts	1	2
8.	Bachelors-commercial art	1	2
9.	Master's-industrial arts	6	10
10.	Master's deaf education	1	2
11.	Master's-curriculum & supervision (+30 in administration)	1	2
12.	Master's guidance and counseling	1	2

Personal background

In addition to educational background, personal background was an important characteristic to be identified for the female industrial arts teachers. Table 10 presents childhood background.

Table 10. Female industrial arts teachers-childhood background

Setting	Number of teachers	Percent
Rural	18	30
Suburban	31	52
Urban	11	18
	60	100

The total is greater than 57 because three teachers indicated they had dual backgrounds.

The personal background section of the characteristics of female industrial arts teachers also dealt with family background. The women in this study indicated their fathers or guardians worked in a number of different occupational areas. Two of the female teachers had fathers who were industrial arts teachers. The occupational areas are summarized in Table 11.

Table 11. Female industrial arts teachers-father's or guardian's occupational area

	Occupational area	Number	Percent
1.	Agriculture/agribusiness	4	7
2.	Business and office	7	12
3.	Communications and media	1	2
4.	Construction	6	10
5.	Fine arts and humanities	1	2
6.	Health	1	2
7.	Home economics	0	0
8.	Hospitality and recreation	1	2
9.	Maintenance and repair	6	10
10.	Manufacturing	4	7
11.	Marketing and distribution	5	9
12.	Natural resources & environment	1	2
13.	Personal services	1	2
14.	Public services	9	16
15.	Teacher	5	9
16.	Industrial arts teacher	2	4
17.	Transportation	4	7

The teachers identified the following occupational areas for their mothers or guardians:

Table 12. Female industrial arts teachers-mother's or guardian's occupational area

	Occupational area	Number	Percent
1.	Agriculture/agribusiness	1	2
2.	Business and office	6	10
3.	Communication media	0	0
4.	Construction	0	0
5.	Fine arts and humanities	0	0
6.	Health	5	9
7.	Home economics	0	0
8.	Hospitality & recreation	1	2
9.	Maintenance & repair	0	0
10.	Manufacturing	1	2
11.	Marketing & distribution	3	5
12.	Natural resources & environment	0	0
13.	Personal services	1	2
14.	Public services	6	10
15.	Teacher	11	19
16.	Transportation	1	2
17.	Homemaker	18	32

The size of the family and the position within the family were also factors to be considered in identification of the background of female industrial arts teachers. The teachers identified on Table 13 the number of siblings within their families. Regarding position in family, 16 of the women in this study were the oldest, 24 were in the middle and 12 were the youngest.

Table 13. Female industrial arts teachers-number of siblings

Number of brothers	Number of teachers	Number of sisters	Number of teachers	Percent
0	9	0	12	21
1	22	1	18	32
2	17	2	17	30
3	3	3	5	9
4	3	4	1	2
5	1	5	3	5
6	1	6	1	2
7	1			
	57		57	

The teachers in this study identified a number of different hobbies or other special interests (Appendix L). This is summarized in Table 14.

Table 14. Female industrial arts teachers-hobbies and other special interests

Area	Number of responses
Sports	43
Music & dance	27
Service organizations	19
Church or civic activities	17
Another business	10
Others	30

Industrial arts education background

In the background information on female industrial arts teachers, it was important to identify their experience

in industrial arts, influences in choosing industrial arts teaching as a career and when they decided to enter industrial arts teaching.

Forty-five of the teachers indicated they had not taken industrial arts in junior high school. Four women had drafting, three had a general exploratory course, two had metals, graphic communications, plastics or arts and crafts and one each had construction, power mechanics or electricity/electronics at the junior high level.

For those teachers who had industrial arts at the secondary level, most of their experience was in the high school. Thirty-two of the 57 teachers indicated they had industrial arts in high school. The highest percentage of teachers had taken courses in traditional industrial arts areas. Nineteen of the teachers had a drafting course and 14 of the teachers had a woodworking course. When organized by cluster, 28 of the teachers had courses in Production, 26 of the teachers had courses in Graphic Communications and six teachers had courses in Energy and Power/Transportation. Three teachers indicated they had a general exploratory course. One teacher each had home repair and girl's industrial arts. The areas in which the teachers had high school courses in industrial arts are displayed on Table 15.

Table 15. Industrial arts courses taken by female industrial arts teachers-high school level

	Course	Number of teachers	Percent
1.	Drafting	19	33
2.	Woodworking	14	25
3.	Graphic communications	5	9
4.	Metals	5	9
5.	Auto	3	5
6.	Electricity/electronics	3	5
7.	General exploratory	3	5
8.	Construction	2	4
9.	Plastics	2	4
10.	Crafts	2	4
11.	Welding	2	4
12.	Design	1	2
13.	Wood carving	1	2
14.	Home repair	1	2
15.	Photography	1	2
16.	Girl's industrial arts	1	2

A number of different people were identified as being influential in the selection of industrial arts teaching. Twelve of the women in this study indicated their high school industrial arts teacher was influential in their decision. Ten teachers identified a college advisor as influential. Twenty-five teachers indicated no one person was influential, but rather the decision to choose industrial arts teaching was a personal one. These results are summarized in Table 16.

Table 16. Female industrial arts teachers-influences in choosing industrial arts teaching as a career

Influential person	Number of teachers	Percent
Junior high industrial arts teacher	1	1
High school industrial arts teacher	12	17
Father	6	8
Mother	2	3
Sister	1	1
Brother	1	1
High school counselor	2	3
College advisor	10	14
Other (husband, friend, another student, superintendent cousin)	12	17
Personal decision	25	35
	72	

Even though some people were identified as being influential, 25 or 35 percent of the women in this study indicated no one influenced them to choose industrial arts teaching as a career. Instead, it was a personal decision. The total for this question is greater than 57 because some women indicated more than one person was influential in their decision.

In addition to influences in choosing industrial arts teaching as a career, a major question to be answered was when the women first became interested in teaching industrial arts. This is summarized in Table 17.

Table 17. Female industrial arts teachers-first interest in teaching industrial arts

Time period	Number	Percent
Junior high school	1	2
High school	10	18
After high school (but not in college)	3	5
Undergraduate in college	34	60
After degree in another field	5	9
Other (always interested, after family was in school, after other jobs)	4	7
	57	

When asked "why did you become interested in teaching industrial arts?" 40 or 71 percent of the teachers said it was personal interest. Twenty-two or 38 percent said it was the opportunities in the field that got them interested. Four or 7 percent indicated the reputation of a program and faculty interested them. Only one or 2 percent of the teachers indicated that modern facilities were influential. Other teachers indicated it was a way to get into woodworking or they had tried other jobs with no satisfaction.

Only 17 or 33 percent of the teachers in this study began their undergraduate degrees in industrial arts. The remaining 40 transferred from other programs. When they transferred and from what programs is presented in Tables 18 and 19.

Table 18. Female industrial arts teachers-when transferred to industrial arts

Time period	Number	Percent
Freshman	7	18
Sophomore	14	35
Junior	10	25
Senior	1	2
After another degree	6	15
Other (on the job, from junior college)	2	5
	40	

Table 19. Female industrial arts teachers-programs transferred from

Program	Number	Percent
Secondary education	6	15
Elementary education	5	13
Undeclared	6	15
Engineering	1	3
Home economics	2	5
General studies	1	3
Business	2	5
Humanities	2	5
Crafts	1	3
Arts	2	5
Music	1	3
Journalism	2	5
Recreation	2	5
Occupational therapy	1	3
Biology	1	3
Physical education	1	3
Industrial design	1	3
Fine arts	1	3
Psychology	1	3
Other	1	3
	40	100

The primary reasons for transferring to industrial arts were personal interest, identified by 29 or 50 percent of the teachers and opportunities in the field, identified by 18 or 31 percent of the teachers.

A major problem of this study was to identify successful recruitment strategies and if they were being utilized. Forty-five or 78 percent of the teachers were never recruited by an industrial arts department. The 12 teachers who were recruited identified the following recruitment practices as being used by college industrial arts departments and others:

-College visit arranged by high school teacher.
-Personal educational invitation
-Tour of facilities and explanation of program and opportunities by dean of the college.
-Industrial arts convention in Atlantic City.
-Recruited by principal to teach industrial arts.
-Recruited by home town high school.
-By telegram from a commercial job.
-College teacher.
-College recruiter.

Work experience (not industrial arts education related)

The teachers had a wide range of work experience outside of teaching industrial arts. The women identified 64 different jobs that ranged from truck driver to adult education teacher (Appendix M). The areas where more than one teacher in the study had work experience are summarized in Table 20.

Table 20. Female industrial arts teachers-other work experience

Area	Number
Clerk	13
Waitress	12
Drafting	7
Graphics	6
Cashier	5
Secretary	5
Construction	4
Camp counselor	4
Tuitoring	3
Artist	3
Photographer	3
Lifeguard	3
Receptionist	2
Babysitting	2
Cook	2
Painting	2
Art teacher	2
Recreation supervisor	2
Florist	2
Camp Fire girls	2
Remodeling	2
Computer programmer	2

When asked "what other careers have you considered?" the teachers identified 49 different areas (Appendix N). Those careers with the highest number of responses are summarized in Table 21.

Table 21. Female industrial arts teachers-other careers considered

Area	Number
Architecture	7
Engineering	7
Graphics	6
Drafting/design	6
Secondary education	4
Commercial art	3
Technical illustration	3
Interior design/decorator	3
General business	3
Photographer	3
Writing	2
Business administration	2
School administrator	2

Recommendations for recruitment

An open-ended question on the questionnaire for the female industrial arts teachers asked "what recommendations can you make regarding increasing the number of female industrial arts teachers?" The teachers' responses were classified into eight categories.

Ten of the teachers recommended the following:

-Women needed to be made aware of the opportunities that were available in industrial arts. High school and junior high school students also needed to be aware of what industrial arts is and the job opportunities available.

Seven teachers recommended the following:

-Females should be exposed to industrial arts at the junior and senior high level.
-Public relations on all aspects of industrial arts.

Six teachers recommended the following:

-More female industrial arts teachers to serve as role models for students.

Three teachers recommended the following:

-Active recruiting programs to increase the number of females involved in industrial arts at all levels.
-Increased salary to serve as an incentive for teaching.
-Working with guidance counselors.

Two teachers recommended the following:

-Recruiting women from other areas.

Summary

The findings presented in this chapter were the result of questionnaires sent to industrial education departments and female industrial arts teachers. Through these questionnaires, the three primary research questions of this study were answered.

Question 1 sought to identify the leading institutions in the recruitment and graduation of women in industrial arts programs. Thirty-seven institutions were identified with total numbers of female graduates and enrollment ranging from 8 to 97.

Question 2 sought to identify effective recruitment strategies. Industrial education departments agreed that four of 20 selected practices were effective. Female industrial arts teachers agreed that nine of the 20 recruitment practices were effective. The industrial education departments and female industrial arts teachers agreed that the following recruitment practices were effective:

- -College industrial arts students recruiting other college and high school students.
- -Contacts with male industrial arts teachers, especially alumni.
- -College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.
- -Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.

Question 3 sought to identify common characteristics of female industrial arts teachers. The teachers in this study had very diverse backgrounds but they generally were younger than their male counterparts, averaged almost four years of teaching experience, were teaching at the senior high level, had undergraduate degrees in industrial arts, although they did not begin their undergraduate program in industrial arts and were not recruited by industrial education departments. Most of the teachers did not take industrial arts at the junior or senior high level. They became interested in teaching industrial arts primarily because of personal interest.

Information from these three questions ultimately resulted in the development of the recruitment model for increasing the number of female industrial arts teachers.

CHAPTER V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the study, conclusions drawn from the findings and recommendations relative to the problems.

Summary

Restatement of the problems

1. To determine institutions where female industrial arts teachers have received their baccalaureate degrees.
2. To determine factors which contribute to successful recruitment and graduation of women.
3. To determine common characteristics of female industrial arts teachers.
4. To develop a recruitment model with identified target populations for use by institutions to bring more women into their industrial arts programs.

Restatement of the purposes

1. To provide the profession with the names of those institutions that have successful recruitment strategies in getting and keeping women in industrial arts programs and identifying what those strategies are.
2. To provide the profession with a profile of the common characteristics of female industrial arts teachers.
3. To provide the profession and industrial arts institutions with a recruitment model that can be used to bring more women into the field.

The need for the study was established from research that indicated industrial arts is a curriculum area that has

experienced severe shortages of teachers, a trend that is expected to continue in the future. When recruiting women in industrial arts, the problems of sex-role stereotyping as well as the potential for women in the field needed to be considered. Recruitment efforts in engineering and other technical programs have proven successful. Expanded efforts to recruit women in industrial arts are needed for the continued existence and improvement of the profession.

The Review of Literature was divided into five major sections. These were:

1. Industrial arts teacher supply and demand.
2. Recruitment of industrial arts teachers.
3. Women in industrial arts
4. Recruiting women in other areas.
5. Career development of women.

Industrial Arts Teacher Supply and Demand cited a number of sources that indicated the critical shortage of industrial arts teachers was expected to continue. The Recruitment of Industrial Arts Teachers section identified successful strategies for influencing people to choose industrial arts teaching as a career. The expanding roles and numbers of women involved in industrial arts at all levels was the focus of the Women in Industrial Arts section. Successful recruitment strategies implemented in engineering and technical programs were identified for the ecruiting

women in other areas section. Career development of women reviewed research that contended women make career choices earlier than men and that women in non-traditional areas need role models and mentors for support.

The Methods and Procedures chapter identified the steps in the development, evaluation and revision of the three survey instruments used in this study. The first instrument, Graduates and Enrollments in Industrial Education, was used to identify those institutions that were the leaders in the recruitment and graduation of women from undergraduate industrial arts programs. The second survey, Recruitment Questionnaire-Industrial Education Departments, was developed for the 30 leading institutions identified from the first survey. Department heads were asked to rate the perceived effectiveness of 20 selected recruitment practices. The third survey, Recruitment Questionnaire-Female Industrial Arts Teachers, included the same perceived effectiveness of 20 recruitment practices the department heads received. The survey also included questions on background information and how each teacher became interested in industrial arts.

The departments that received the Graduates and Enrollments in Industrial Education survey were the 138 departments that had 10 or more graduates in 1979-80 as identified in the Industrial Teacher Education Directory.

The target population for the second survey consisted of the 30 leading institutions in the recruitment and graduation of women as identified from the first survey. The female industrial arts teachers were identified by the department heads on the initial questionnaire.

After the survey instruments were developed and target populations identified, the questionnaires were administered to the selected samples. Of the 138 departments that received the initial survey, 84 or 61 percent, completed and returned the questionnaire.

The second questionnaire was mailed to the top 37 institutions as identified from the first survey. Thirty-five of the questionnaires on perceived effectiveness of recruitment practices were completed and returned. The departments identified 111 female industrial arts teachers. Questionnaires were mailed to 95 of the teachers. Fifty-one of the returned surveys had both parts, the background information and perceived effectiveness of recruitment practices, completed. Six other surveys were returned with the first part only completed.

With the questionnaires returned, the next step was the analysis of data. Question 1 sought to identify the 30 leading institutions in the recruitment and graduation of women. Institutions were ranked in order according to the total number of female graduates and enrollments in industrial arts.

Question 2 sought to identify successful recruitment strategies for getting women into the industrial arts profession. The results of the perceived effectiveness of recruitment practices for both industrial arts departments and teachers were analyzed using a Kolmogorov-Smirnov Goodness of Fit test. The industrial education departments were in agreement that four of the recruitment practices were effective. The teachers were in agreement that one practice was very effective and eight other practices were effective. The four practices that both the industrial education departments and female industrial arts teachers perceived as effective were:

- -College industrial arts students recruiting other college and high school students.
- -Contacts with male industrial arts teachers, especially alumni.
- -College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.
- -Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.

Question 3 sought to identify common characteristics of female industrial arts teachers. Standard descriptive statistics were used in the analysis of this data. Teachers had an average age of 27.3 years and averaged 3.79 years of teaching experience. They were teaching at the senior high level in traditional areas such as woods and drafting. The majority of teachers had not taken industrial arts at the junior or senior high level.

Although a number of different people were identified as being influential in the decision to choose industrial arts teaching as a career, no one specific person was especially influential. Most of the teachers indicated that this was a personal decision and no one influenced them. More research is needed in the area of personal decision before any conclusions can be drawn.

Most of the teachers became interested in teaching industrial arts as undergraduates in college. They had transferred from different majors.

The majority of teachers (78 percent) indicated that they were never recruited into the industrial arts profession.

Most of the other work experience the teachers had was in non-technical areas. The greatest number of other careers considered were in technical, industrial arts related areas and education.

The teachers offered other suggestions for increasing the number of women teaching industrial arts. The highest number of responses were under awareness, public relations and increasing the number of female teachers and students in junior and senior high industrial arts programs.

Conclusions

The following conclusions were drawn from the findings presented in Chapter IV. The conclusions are presented

relative to the three research questions of the study and the problem identifying the development of a recruitment model.

Question 1:

What institutions in the United States are leaders in the recruitment and graduation of women in undergraduate industrial arts programs?

The 37 leading institutions had a total of 347 female graduates and a total of 324 female students enrolled at the undergraduate level. These institutions were located primarily in the eastern and southern sections of the United States.

Question 2:

What are successful recruitment strategies for getting women into the industrial arts profession?

Although a number of recruitment practices are utilized, few are perceived as being effective. There are a total of four identifiable recruitment practices that are effective. However, the majority are perceived as ineffective.

Question 3:

What are some of the common characteristics of female industrial arts teachers?

Women are relatively new to the industrial arts teaching profession and are younger than their male counterparts. They are teaching primarily at the senior high level in traditional areas such as woods and drafting. The female teachers came from such a variety of diverse backgrounds that

no generalizations can be made concerning commonalities. They did become interested in teaching industrial arts as undergraduates in college and no one influenced them. It was a personal decision.

Although not stated as a specific research question, the primary purpose of this study was stated as follows:

Problem 4:

To develop a recruitment model with identified target populations for use by institutions to bring more women into their industrial arts programs.

The recruitment model that follows was developed from input by industrial education departments and female industrial arts teachers. The specific recruitment strategies listed are those perceived as effective by departments and teachers as identified on the recruitment questionnaire. Other strategies are those recommended for increasing the number of female industrial arts teachers by female teachers.

The procedural model includes four major stages:

1. Awareness - This phase includes making students aware of what industrial arts is and the opportunities available. It also involves selling your industrial arts program to parents, counselors, administrators and the public. Students must be cognizant of the opportunities in industrial arts and females especially must realize those opportunities are available to them.

2. Exploratory - Once students are aware of industrial arts, general introductory courses must be available for them to explore their own interests and abilities. Female students may not have had any previous experience in industrial arts. An exploratory course should stimulate their interest and introduce them to the three clusters-production, communications and energy and power-in industrial arts.

Awareness

Secondary Level	Post-secondary Level
1. Sell your program. Make students, parents, administrators, faculty, counselors and the public aware of what you are doing in industrial arts.**	1. Sell your program and facilities to high school pupils and their parents and other students when they visit your department.**
2. Examine teaching behavior. Avoid sexist benavior and sex-role stereotyping.	2. Invite potential students to visit your campus through personal letters or contact.
3. Make students aware of the opportunities that exist and the need for industrial arts teachers to lessen the critical shortages.	3. Prepare a brochure, slide-tape or other media that shows department offerings and opportunities.*
4. Have materials on college industrial arts programs available to students.	

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* Perceived effective-teachers

** Perceived effective departments and teachers

Figure 1. Procedural Model for Recruiting Women in Industrial Arts-Awareness Activities

Exploratory

Secondary Level	Post-secondary Level
1. Have an industrial arts course required for all students at the junior high or middle school level.	1. Offer general education courses which would stimulate the interest of non-industrial arts majors.**
2. Check course content. Be sure it is relevant to all students.	
3. Offer a semester length general introductory course for students who might not otherwise take industrial arts at the senior high level.**	

** Perceived effective-departments and teachers

Figure 2. Procedural Model for Recruiting Women in Industrial Arts-Exploratory Activities

Experiential

Secondary Level	Post-secondary Level
1. Invite college faculty members to speak to your classes about their industrial arts programs.	1. Sponsor industrial arts contests for high school pupils.*
2. Have your students participate in college-sponsored industrial arts contests.*	2. Work with industrial arts teachers associations. Offer the opportunity for secondary school pupils to visit your college.*
3. Take your students to visit college campuses for career days, open house or other activities.**	3. Offer scholarships for students in your program.*
	4. Sponsor career days, an open house, conference or other activities.**
	5. Work with state and national industrial arts associations in the distribution of recruitment material and activities.**

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* Perceived effective-teachers

** Perceived effective departments and teachers

Figure 3. Procedural Model for Recruiting Women in Industrial Arts-Experiential Activities

Guidance

Secondary Level	Post-secondary Level
1. Work with guidance counselors. Make them aware of the opportunities available for students in industrial arts.	1. Encourage current students to recruit other college and high school students.**
2. Encourage students who have the potential for industrial arts teaching.	2. Work with the student counseling service on campus. Make them aware of the opportunities in your department.
3. Be a good role model for all students.	3. Offer support services or group activities for the women in your department.
4. Keep in contact with students in industrial arts programs at the college level. Encourage them.	4. Maintain contact with your alumni, who are currently teaching.**
	5. Establish contact with community colleges in your area.*

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* Perceived effective-teacners

** Perceived effective departments and teachers

Figure 4. Procedural Model for Recruiting Women in Industrial Arts-Guidance Activities

Figure 5. Procedural Model for Recruitment Women in Industrial Arts

Secondary

1. Sell your program. Make students, parents, administrators, faculty, counselors and the public aware of what you are doing in industrial arts.

2. Examine teaching behavior. Avoid sexist benavior and sex-role stereotyping.

3. Make students aware of the opportunities that exist and the need for industrial arts teachers to lessen the critical shortages.

4. Have materials on college industrial arts programs available to students.

1. Have an industrial arts course required for all students at the junior high or middle school level.

2. Check course content. Be sure it is relevant to all students.

3. Offer a semester length general introductory course for students who might not otherwise take industrial arts at the senior high level.

1. Invite college faculty members to speak to your classes about their industrial arts programs.

2. Have your students participate in college-sponsored industrial arts contests.

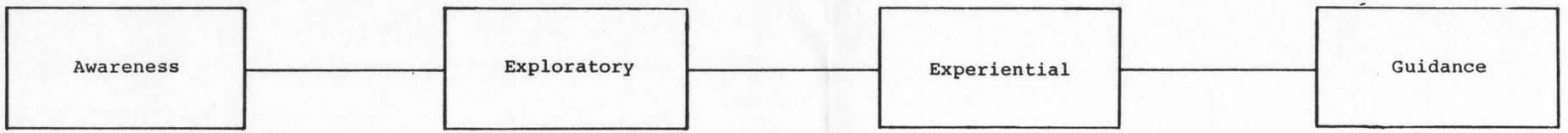
3. Take your students to visit college campuses for career days, open house or other activities.

1. Work with guidance counselors. Make them aware of the opportunities available for students in industrial arts.

2. Encourage students who have the potential for industrial arts teaching.

3. Be a good role model for all students.

4. Keep in contact with students in industrial arts programs at the college level. Encourage them.



Post-secondary

1. Sell your program and facilities to high school pupils and their parents and other students when they visit your department.

2. Invite potential students to visit your campus through personal letters or contact.

3. Prepare a brochure, slide-tape or other media that shows department offerings and opportunities.

1. Offer general education courses which would stimulate the interest of non-industrial arts majors.

1. Sponsor industrial arts contests for high school pupils.

2. Work with industrial arts teachers associations. Offer the opportunity for secondary school pupils to visit your college.

3. Offer scholarships for students in your program.

4. Sponsor career days, an open house, conference or other activities.

5. Work with state and national industrial arts associations in the distribution of recruitment material and activities.

1. Encourage current students to recruit other college and high school students.

2. Work with the student counseling service on campus. Make them aware of the opportunities in your department.

3. Offer support services or group activities for the women in your department.

4. Maintain contact with your alumni, who are currently teaching.

5. Establish contact with community colleges in your area.

3. Experiential - After students are aware of industrial arts and have taken an exploratory industrial arts course, the next step in recruitment is to expose them to specific recruitment activities. This involves participation in college-sponsored contests, visits to college campuses for career days and others.

4. Guidance - The final step in the recruitment model is guidance to facilitate the decision making process for students. Once students have made the decision to enter industrial arts teaching, support activities to encourage them, especially for female students, are recommended. Guidance also involves working with current students and alumni who are teaching to facilitate their efforts in recruitment.

Secondary and post-secondary industrial arts departments are encouraged to follow the four steps listed in the recruitment model. Specific recruitment activities may be adapted to meet individual needs.

Recommendations

Following the conclusions of this study on recruiting women in industrial arts, a number of recommendations can be made regarding further research and recruitment. They are as follows:

1. It is recommended that this recruitment model be utilized by secondary and post-secondary industrial arts departments.

2. It is recommended that this recruitment model be field tested and evaluated to determine the effectiveness of the process and recruitment practices.

3. Industrial arts departments should periodically evaluate and revise when necessary the recruitment practices they utilize.

4. Further research is recommended to identify other successful recruitment practices.

5. Follow-up studies on women who were recruited into industrial arts programs, including undergraduate through teaching, is recommended to determine effectiveness of recruitment practices.

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ACKNOWLEDGMENTS

I cannot begin to express my thanks to the many people who have assisted me in writing this thesis.

I especially want to thank Dr. Robert Gelina for his patience, guidance and friendship while serving as my major professor. His leadership challenged me and set high standards professionally. For this, I am grateful.

My committee, Dr. William Miller, Dr. Trevor Howe and Dr. Margaret Torrie, offered valuable insight in the development of the proposal and final review of this study.

I would like to thank my sister and brother, Jeanie and Mike, and sister and brother-in-law, Sue and Tom Cahalan, and a number of friends who assisted in all aspects of this study.

Most of all, I want to thank my parents, Donald and Rosemary Theobald. Through their love, understanding and encouragement, they have given me the chance to grow and become all that I can be.

APPENDIX A: GRADUATES AND ENROLLMENTS IN INDUSTRIAL EDUCATION SURVEY INSTRUMENT

ections: For each of the following fiscal years, the total number of graduates with baccalaurate degrees from your department is given in column A. These numbers were listed in the Industrial Teacher Education Directories. Please complete the total number of graduates with baccalaurate degrees from July 1, 1980 to June 30, 1981 in column A. Then for each of the five years, list the number of female graduates in teaching in column B and the number of female graduates in industry and technology programs in column C.

Fiscal Year	A Total Number of Graduates with Bachelor's degrees	B Female Graduates in Teaching	C Female Graduates in Industry and Technology Programs
1980-81			
1979-80			
1978-79			
1977-78			
1976-77			

ections: For each of the four categories, list the enrollments in your department at each level as of August 1, 1981.

	Total Number of Students in Teaching Program	Females in Teaching Programs	Total Number of Students in Industry and Technology Programs	Females in Industry and Technology Programs
shman				
nomore				
ior				
ior				

t the name, address and phone number (if available) of three female industrial arts chers. They will be part of the sample for the second part of this study.

APPENDIX B: COVER LETTER AND FOLLOW-UP LETTER FOR APPENDIX A

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

Sept. 1, 1981

Dear Department Head:

I am currently conducting a study on recruiting women in industrial arts for my master's thesis at Iowa State University. Part of the study is identifying those colleges and universities that are the leaders in graduating women from industrial arts programs.

On the enclosed form, please list the number of female graduates in the two catagories shown. This information is for the five previous school years. There are also spaces for listing the current enrollments at all four undergraduate levels in both teaching and industry (non-teaching) programs. This information will be used to determine the 30 leading institutions in graduating women in industrial arts.

The second part of this recruitment study is to interview 50 female industrial arts teachers to determine if they were recruited into the profession and what common characteristics they have. I would like to ask if you could identify three female industrial arts teachers for possible interview. Please list the names, addresses and phone numbers, if available, of these individuals on the bottom of the attached questionnaire. Use additional space if you can identify more than three.

The completion of this study will yield a list of successful recruitment strategies identified by department administrators and female industrial arts teachers. A recruitment model will also be developed that can be implemented within the profession.

I would appreciate your completing and returning the enclosed questionnaire by September 15. A summary of the results will be forwarded to all participating individuals. Thank you for your assistance.

Sincerely,

Marie Theobald
Industrial Arts Instructor
Stilwell Junior High
West Des Moines, Iowa

September 21, 1981

Dear Department Head,

I recently mailed you a questionnaire titled Graduates and Enrollments in Industrial Education. Please complete the survey and return it to me by October 1, even if you have no female graduates or students in industrial arts. I need your response to complete the data for my thesis at Iowa State University on Recruiting Women in Industrial Arts. Thank you for your assistance.

Marie Theobald

Stilwell Junior High
West Des Moines, Ia. 50265

APPENDIX C: RECRUITMENT QUESTIONNAIRE INDUSTRIAL EDUCATION DEPARTMENTS

INDUSTRIAL EDUCATION DEPARTMENT HEADS
RECRUITMENT QUESTIONNAIRE

The following is a list of methods used for recruiting students into industrial arts programs. If your department utilized the recruitment practice listed, place an M if the target population is primarily male, an F if the target population is female, a B if the recruitment practice is directed at both males and females and an NA if the recruitment practice is not used by your department. Place the appropriate letter in the target population column. Then rate each practice, whether your department utilizes it or not, according to how you perceive it's effectiveness in influencing people to enter industrial arts programs. Place a check in the column that corresponds to your opinion with 1 being totally ineffective to 5 being very effective.

Example:

Recruitment Practice	Target Population M, F, B, NA	Perceived Effectiveness Totally Ineffective 1	2	3	4	Very Effective 5
Contacts with industrial arts teachers.	B					X

Contacts with industrial arts teachers is a very effective method for recruiting both males and females.

Recruitment Practice	Target Population M, F, B, NA	Perceived Effectiveness Totally Ineffective 1	2	3	4	Very Effective 5
. College industrial arts students recruiting other college and high school students.						
. Contacts with own college freshmen and counselors.						
. High school visits by college industrial arts department faculty.						
. Personal letters to interested high school pupils.						
. Community college visits by college industrial arts department faculty.						
. Contacts with high school supervisors and administrators through student teaching programs.						
Industrial arts teachers association bringing secondary school pupils to visit the college.						

Recruitment Practice	Target Population M, F, B, NA	Perceived Effectiveness Totally Ineffective 1	2	3	4	Very Effective 5
8. Distribution of brochures to high school and community college students.						
9. College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.						
10. Contacts with female industrial arts teachers, especially alumni.						
11. Contacts with high school guidance counselors.						
12. Filmed presentation (slides and tape recorder) of the departmental offerings.						
13. College-paid recruiters traveling the state and country.						
14. Contacts with male industrial arts teachers, especially alumni.						
15. College-sponsored industrial arts contests for high school pupils.						
16. College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.						
17. Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.						
18. College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.						
19. Scholarships for industrial arts college programs.						
20. Career days, open house or conference activities.						

APPENDIX D: COVER LETTER FOR APPENDIX C

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

October 1, 1981

Dear Department Head:

Your institution has been identified as one of the top 30 colleges and universities with female graduates and students in the United States. This information was from a preliminary survey you received and completed the first part of September. Enclosed is a second survey on specific recruitment practices. A similar survey is also being sent to 50 female industrial arts teachers from the pool of teachers you identified on the preliminary survey. Information from both of these surveys will be used to develop a recruitment model.

On the enclosed form, please identify the target population--males, females or both groups--for each specific recruitment practice. Then rate each recruitment practice according to how you perceive it's effectiveness in influencing people to enter your industrial arts program.

I would appreciate your completing and returning the enclosed questionnaire by October 14. You will receive a copy of the recruitment model when it is developed. Thank you for your assistance.

Sincerely,

Marie Theobald
Industrial Arts Instructor
Stilwell Junior High
West Des Moines, Iowa 50265

APPENDIX E: RECRUITMENT QUESTIONNAIRE
FEMALE INDUSTRIAL ARTS TEACHERS

Female Industrial Arts Teachers Questionnaire

1. Name _____

2. Age _____

3. No. of years teaching industrial arts:

   ____ 1
   ____ 2
   ____ 3
   ____ 4
   ____ 5
   ____ 6
   ____ 7
   ____ 8
   ____ 9
   ____ 10
   ____ Other (specify) _____

4. What levels? (List number of years at each level.)

   ____ Elementary
   ____ Junior High
   ____ Senior High
   ____ Post secondary
   ____ Other (specify) _____

5. What areas were taught?

   ____ Auto
   ____ Building Trades
   ____ Power Mechanics
   ____ Energy and Power/ Transportation
   ____ Drafting
   ____ Design
   ____ Electricity/Electronics
   ____ Graphic Communications
   ____ Woods
   ____ Metals
   ____ Plastics
   ____ Manufacturing
   ____ Welding
   ____ General Exploratory
   ____ Other (specify)
   _____
   _____

6. What undergraduate degrees(s) do you have?

   ____ B.S. or B.A. in Industrial Arts
   ____ Other (specify) _____

7. What graduate degrees do you have?

   ____ M.S. or M.A. in Industrial Arts
   ____ Ph D. in Industrial Arts
   ____ Other (specify) _____

8. In which states do you have certification to teach industrial arts?

   _____

   _____

9. What junior high industrial arts courses did you have? (List time in each area.)

____ Auto
____ Construction
____ Power Mechanics
____ Energy and Power/ Transportation
____ Drafting
____ Design
____ Electricity/Electronics
____ Other (specify) _____

____ Graphic Communications
____ Woods
____ Metals
____ Plastics
____ Manufacturing
____ Welding
____ General Exploratory
____ None

10. What high school industrial arts courses did you have? (List time in each area.)

____ Auto
____ Construction
____ Power Mechanics
____ Energy and Power/ Transportation
____ Drafting
____ Design
____ Electricity/Electronics
____ Other (specify) _____

____ Graphic Communications
____ Woods
____ Metals
____ Plastics
____ Manufacturing
____ Welding
____ General Exploratory
____ None

11. What was the size of your high school graduating class?

____ Less than 50
____ 51-100
____ 101-200
____ 251-500
____ Over 500

12. Was your high school:

____ Public
____ Private

13. You were reared in what type of setting?

____ Rural
____ Suburban
____ Urban

14. What are (were) your father's, mother's, or guardian's occupations?

Father or Guardian _____
Mother or Guardian _____

15. Number of brothers:

____ None
____ 1
____ 2
____ 3
____ Other (specify)

16. Number of sisters:

____ None
____ 1
____ 2
____ 3
____ Other (specify)

17. Position in family:
____ Oldest
____ Middle
____ Youngest
____ Other (specify) _____

18. What are your hobbies or other special interests? (Specify in each category checked.)
____ Sports _____
____ Music and Dance _____
____ Service Organizations _____
____ Church or Civic Activities _____
____ Another business _____
____ Other (specify) _____

19. Who influenced you to choose industrial arts teaching as a career?
____ Junior high industrial arts teacher
____ High school industrial arts teacher
____ Father ____ Mother ____ Sister ____ Brother
____ High school counselor
____ College advisor
____ Other (specify)
____ No one. It was a personal decision.

20. When did you first become interested in teaching industrial arts?
____ Junior high
____ High school
____ As an undergraduate in college
____ After graduation from high school, but not in college
____ After degree in another field
____ Other (specify) _____

21. Why did you become interested in teaching industrial arts?
____ Opportunities in the field
____ Reputation of program and faculty
____ Modern facilities
____ Personal interest
____ Other (specify) _____

22. Did you begin your undergraduate degree in an industrial arts program?
____ Yes
____ No

23. If not, when did you transfer?
____ Freshman
____ Sophomore
____ Junior
____ Senior
____ After another degree
____ Other (specify) _____

24. What program did you transfer from?

____ Engineering	____ Architecture
____ Home Economics	____ General Studies
____ Elementary Education	____ Business
____ Secondary Education	____ Humanities
____ Undeclared	____ Other (specify)

25. Why did you decide to transfer to industrial arts?

____ Opportunities in field
____ Reputation of program and faculty
____ Modern facilities
____ Personal interest
____ Other (specify) _____

26. Were you ever recruited by an industrial arts department?

____ Yes
____ No

27. How were you recruited?

_____

_____

_____

28. What other work experience do you have?

_____

_____

_____

29. What other careers have you considered?

_____

_____

_____

30. What recommendations can you make regarding increasing the number of female industrial arts teachers?

_____

_____

_____

31. What advice would you give to women who are considering a career in industrial arts?

_____

_____

_____

FEMALE INDUSTRIAL ARTS TEACHERS
RECRUITMENT QUESTIONNAIRE

The following is a list of methods used for recruiting students into industrial arts programs. If you had actually experienced a recruitment practice, place a check on the line in the actual experience column that corresponds to that practice. Then rate each practice, whether you experienced it or not, according to how you perceive it's effectiveness in influencing people to enter industrial arts programs. Place a check in the appropriate column with 1 being totally ineffective to 5 being very effective.

Example:

Recruitment Practice	Actual Experience	Perceived Effectiveness Totally Ineffective				Very Effective
		1	2	3	4	5
Contacts with industrial arts teachers.	X					X

Contacts with industrial arts teachers is a very effective method for recruiting both males and females.

Recruitment Practice	Actual Experience	Perceived Effectiveness Totally Ineffective				Very Effective
		1	2	3	4	5
1. College industrial arts students recruiting other college and high school students.						
2. Contacts with own college freshmen and counselors.						
3. High school visits by college industrial arts department faculty.						
4. Personal letters to interested high school pupils.						
5. Community college visits by college industrial arts department faculty.						
6. Contacts with high school supervisors and administrators through student teaching programs.						
7. Industrial arts teachers association bringing secondary school pupils to visit the college.						

Recruitment Practice	Actual Experience	Perceived Effectiveness Totally Ineffective 1	2	3	4	Very Effective 5
8. Distribution of brochures to high school and community college students.						
9. College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.						
10. Contacts with female industrial arts teachers, especially alumni.						
11. Contacts with high school guidance counselors.						
12. Filmed presentation (slides and tape recorder) of the departmental offerings.						
13. College-paid recruiters traveling the state and country.						
14. Contacts with male industrial arts teachers, especially alumni.						
15. College-sponsored industrial arts contests for high school pupils.						
16. College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.						
17. Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.						
18. College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.						
19. Scholarships for industrial arts college programs.						
20. Career days, open house or conference activities.						

APPENDIX F: COVER LETTER AND FOLLOW-UP LETTERS FOR APPENDIX E

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

October 7, 1981

Dear Industrial Arts Teacher:

I am currently conducting a study on recruiting women in industrial arts for my master's thesis at Iowa State University. Serious shortages of industrial arts teachers have been reported over the past 30 years by the majority of states. This trend is expected to continue and even worsen in the future. The completion of this study will yield a list of successful recruitment strategies identified by department administrators and female industrial arts teachers. A recruitment model will then be developed that can be implemented within the profession.

You have been randomly selected from a pool of female industrial arts teachers identified by department heads in the first part of this study. I would like to ask if you could please complete the enclosed questionnaire so your responses can be included in the development of the recruitment model. All replies will be strictly confidential.

The first part of the questionnaire deals with your background and experiences in industrial arts. The second part of the questionnaire is a list of twenty recruitment practices. If you were actually exposed to the recruitment practice, please check the actual experience column. Then rate each practice, whether you experienced it or not, on how you perceive its effectiveness in influencing people to enter industrial arts programs.

I would appreciate your completing and returning the enclosed questionnaire by October 19. Thank you for your assistance.

Sincerely,

Marie Theobald
Industrial Arts Instructor
Stilwell Junior High
West Des Moines, Iowa 50265

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

November 16, 1981

Dear Industrial Arts Teacher:

I am currently conducting a study on recruiting women in industrial arts for my master's thesis at Iowa State University. Serious shortages of industrial arts teachers have been reported over the past 30 years by the majority of states. This trend is expected to continue and even worsen in the future. The completion of this study will yield a list of successful recruitment strategies identified by department administrators and female industrial arts teachers. A recruitment model will then be developed that can be implemented within the profession.

You have been randomly selected from a pool of female industrial arts teachers identified by department heads in the first part of this study. I would like to ask if you could please complete the enclosed questionnaire so your responses can be included in the development of the recruitment model. All replies will be strictly confidential.

The first part of the questionnaire deals with your background and experiences in industrial arts. The second part of the questionnaire is a list of twenty recruitment practices. If you were actually exposed to the recruitment practice, please check the actual experience column. Then rate each practice, whether you experienced it or not, on how you perceive its effectiveness in influencing people to enter industrial arts programs.

I would appreciate your completing and returning the enclosed questionnaire by December 7. Thank you for your assistance.

Sincerely,

Marie Theobald
Industrial Arts Instructor
Stilwell Junior High
West Des Moines, Iowa 50265

Iowa State University of Science and Technology Ames, Iowa 50011

College of Education
Industrial Education
Telephone 515-294-1033

December 3, 1981

Dear Industrial Arts Teacher:

On September 1, I mailed you a questionnaire on Recruiting Women in Industrial Arts. I am concerned that some of you may not have received the questionnaire because of incomplete addresses or insufficent postage.

I am still collecting data for this study. It is for my master's thesis at Iowa State University. I have enclosed another copy of the questionnaire.

The first part of the questionnaire deals with your background and experiences in industrial arts. The second part of the questionnaire is a list of twenty recruitment practices. If you were actually exposed to the recruitment practice, please check the actual experience column. Then rate each practice, whether you experienced it or not, on how you perceive its effectiveness in influencing people to enter industrial arts programs.

I would like to include your responses in the data and the development of the recruitment model. Please complete the enclosed questionnaire and return it by December 22. All replies will be strictly confidential. If you received the original questionnaire mailed in September, I would like to know your reasons for not completing it. Thank you for your assistance.

Sincerely,

Marie Theobald
Industrial Arts Instructor
Stilwell Junior High
West Des Moines, Iowa 50265

APPENDIX G: BASIC PROGRAM FOR KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST

```
1  HOME
2  REM ************************
3  REM * FREQUENCY HISTOGRAM  *
4  REM * CREATOR CONVERTED TO *
5  REM *     APPLESOFT BY     *
6  REM *      BOB KRUSE       *
7  REM ************************
10  DEF  FN F(X) =  INT (10000 *
     X + .5) / 10000
20  INPUT A,B,C,D,E,F: PRINT : PRINT
     : PRINT : PRINT  TAB( 10);"F
     REQUENCY HISTOGRAM":T = A +
     B + C + D + E + F:
30  PRINT : FOR I = 1 TO 40: PRINT
     "*";: NEXT : PRINT : PRINT :
      PRINT "VERY EFFECTIVE
      ";: PRINT A;: PRINT "  ";: FOR
     I = 1 TO A: PRINT "*";: NEXT

40  PRINT : PRINT "EFFECTIVE
           ";: PRINT B;: PRINT "
       ";: FOR I = 1 TO B: PRINT
     "*";: NEXT : PRINT : PRINT "
     NEUTRAL                ";: PRINT
     C;: PRINT "  ";: FOR I = 1 TO
     C: PRINT "*";: NEXT
50  PRINT : PRINT "INEFFECTIVE
           ";: PRINT D;: PRINT "
       ";: FOR I = 1 TO D: PRINT
     "*";: NEXT
60  PRINT : PRINT "TOTALLY INEFFE
     CTIVE  ";: PRINT E;: PRINT "
       ";: FOR I = 1 TO E: PRINT
     "*";: NEXT : PRINT : PRINT "
     NO RESPONSE            ";: PRINT
     F;: PRINT "  ";: FOR I = 1 TO
     F: PRINT "*";: NEXT : PRINT
     : PRINT
70  FOR I = 1 TO 40: PRINT "*";: NEXT
     : PRINT : PRINT : PRINT : PRINT
     : PRINT  TAB( 6);"KOLMOGOROV
     -SMIRNOV ANALYSIS":
80  PRINT : FOR I = 1 TO 40: PRINT
     "*";: NEXT : PRINT : PRINT :
      PRINT "FREQUENCY"; TAB( 11)
     ;A; TAB( 16);B; TAB( 21);C; TAB(
     26);D; TAB( 31);E; TAB( 36);
     F;
```

```
90  PRINT :F1 = A / T:F2 = F1 + (
    B / T):F3 = F2 + (C / T):F4 =
    F3 + (D / T):F5 = F4 + (E /
    T):F6 = F5 + (F / T): PRINT
    "  FO(X)";: PRINT  TAB( 10);
     FN F(F1);
100  PRINT  TAB( 15); FN F(F2);: PRINT
     TAB( 20); FN F(F3);: PRINT
     TAB( 25); FN F(F4);: PRINT
     TAB( 30); FN F(F5);: PRINT
     TAB( 35); FN F(F6);: PRINT
    : PRINT "  FT(X)";
110  PRINT  TAB( 10);".169";: PRINT
     TAB( 15);".334";: PRINT  TAB(
    20);".501";: PRINT  TAB( 25)
    ;".668";
120  PRINT  TAB( 30);".835";: PRINT
     TAB( 35);"1.000";: PRINT : PRINT
    "   D";: PRINT  TAB( 10); FN
    F( ABS (F1 - .169));: PRINT
     TAB( 15); FN F( ABS (F2 - .
    334));: PRINT  TAB( 20); FN
    F( ABS (F3 - .501));
130  PRINT  TAB( 25); FN F( ABS (
    F4 - .668));: PRINT  TAB( 30
    ); FN F( ABS (F5 - .835));: PRINT
     TAB( 35); FN F( ABS (F6 - 1
    ));: PRINT : FOR I = 1 TO 40
    : PRINT "*";: NEXT : PRINT :
     PRINT : PRINT : PRINT
140 C1 = 1.36 /  SQR (T): PRINT "
      THE CRITICAL VALUE = ";C1:
     PRINT : PRINT : IF  ABS (F1
     - .169) > C1 THEN 200
150  IF  ABS (F2 - .334) > C1 THEN
    200
160  IF  ABS (F3 - .501) > C1 THEN
    200
170  IF  ABS (F4 - .668) > C1 THEN
    200
180  IF  ABS (F5 - .835) > C1 THEN
    200
190  PRINT "  THE NULL HYPOTHESIS
     IS ACCEPTED.": PRINT : PRINT
    : PRINT : GOTO 210
200  PRINT "  THE NULL HYPOTHESIS
     IS NOT ACCEPTED.": PRINT : PRINT
    : PRINT
210  INPUT "DO YOU WANT TO MAKE A
    NOTHER HISTOGRAM?  (Y/N) ";A
    $: IF A$ = "Y" THEN  PRINT :
     PRINT : GOTO 20
220  END
```

APPENDIX H: RECRUITMENT PRACTICE ACTUAL EXPERIENCE FEMALE INDUSTRIAL ARTS TEACHERS (N=51)

	Recruitment Practice	Actual Experience Yes	No
1.	College industrial arts students recruiting other college and high school students.	1.2 (24%)	39 (76%)
2.	Contacts with own college freshmen and counselors.	10 (20%)	41 (80%)
3.	High school visits by college industrial arts department faculty.	6 (12%)	45 (88%)
4.	Personal letters to interested high school pupils.	4 (8%)	47 (92%)
5.	Community college visits by college industrial arts department faculty.	3 (6%)	48 (94%)
6.	Contacts with high school supervisors and administrators through student teaching programs.	10 (20%)	41 (80%)
7.	Industrial arts teachers association bringing secondary school pupils to visit the college.	8 (16%)	43 (84%)
8.	Distribution of brochures to high school and community college students.	6 (12%)	45 (88%)
9.	College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.	3 (6%)	48 (94%)
10.	Contacts with female industrial arts teachers, especially alumni.	3 (6%)	48 (94%)
11.	Contacts with high school guidance counselors.	6 (12%)	45 (88%)
12.	Filmed presentation (slides and tape recorder) of the departmental offerings.	4 (8%)	47 (92%)
13.	College-paid recruiters traveling the state and country.	2 (4%)	49 (96%)

	Recruitment Practice	Actual Experience Yes	No
14.	Contacts with male industrial arts teachers, especially alumni.	11 (22%)	40 (78%)
15.	College-sponsored industrial arts contests for high school pupils.	10 (20%)	41 (80%)
16.	College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.	9 (18%)	42 (82%)
17.	Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.	4 (8%)	47 (92%)
18.	College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.	3 (6%)	48 (94%)
19.	Scholarships for industrial arts college programs.	4 (8%)	47 (92%)
20.	Career days, open house or conference activities.	5 (10%)	46 (90%)

APPENDIX I: KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST AND FREQUENCY HISTOGRAM-INDUSTRIAL EDUCATION DEPARTMENTS

1. College industrial arts students recruiting other college and high school students.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          9   *********
EFFECTIVE               9   *********
NEUTRAL                 9   *********
INEFFECTIVE             4   ****
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             4   ****

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 9    9    9    4    0    4
  FO(X)   .2571.5143.7714.8857.88571
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0881.1803.2704.2177.05070
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

2. Contacts with own college freshmen and counselors.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE        2   **
EFFECTIVE             9   *********
NEUTRAL              17    *****************
INEFFECTIVE           4   ****
TOTALLY INEFFECTIVE   1   *
NO RESPONSE           2   **

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 2    9    17   4    1    2
  FO(X)   .0571.3143.8   .9143.94291
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1119.0197.299 .2463.10790
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

3. High school visits by college industrial arts department faculty.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          4   ****
EFFECTIVE               7   *******
NEUTRAL                 13   *************
INEFFECTIVE             6   ******
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             5   *****

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 4     7     13    6     0     5
  FO(X)   .1143.3143.6857.8571.85711
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0547.0197.1847.1891.02210
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

4. Personal letters to interested high school pupils.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          5   *****
EFFECTIVE               12   ************
NEUTRAL                 7   *******
INEFFECTIVE             4   ****
TOTALLY INEFFECTIVE     2   **
NO RESPONSE             5   *****

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 5     12    7     4     2     5
  FO(X)   .1429.4857.6857.8    .85711
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0261.1517.1847.132 .02210
*****************************************
```

THE CRITICAL VALUE = .229981957

THE NULL HYPOTHESIS IS ACCEPTED.

5. Community college visits by college industrial arts department faculty.

FREQUENCY HISTOGRAM

```
****************************************

VERY EFFECTIVE          6   ******
EFFECTIVE               7   *******
NEUTRAL                 9   *********
INEFFECTIVE             3   ***
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             9   *********

****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
****************************************

FREQUENCY 6     7     9     3     1     9
  FO(X)   .1714.3714.6286.7143.74291
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      2.4E-03.0374.1276.0463.09210
****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

6. Contacts with high school supervisors and administrators through student teaching programs.

FREQUENCY HISTOGRAM

```
****************************************

VERY EFFECTIVE          5   *****
EFFECTIVE               8   ********
NEUTRAL                 14   **************
INEFFECTIVE             6   ******
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             1   *

****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
****************************************

FREQUENCY 5     8     14    6     1     1
  FO(X)   .1429.3714.7714.9429.97141
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0261.0374.2704.2749.13640
****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

7. Industrial arts teachers association bringing secondary school pupils to visit the college.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          5   *****
EFFECTIVE               12   ************
NEUTRAL                 8   ********
INEFFECTIVE             4   ****
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             6   ******

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 5     12    8     4     0     6
  FO(X)   .1429.4857.7143.8286.82861
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0261.1517.2133.16066.4E-030
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

8. Distribution of brochures to high school and community college students.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          2   **
EFFECTIVE               10   **********
NEUTRAL                 12   ************
INEFFECTIVE             6   ******
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             4   ****

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 2     10    12    6     1     4
  FO(X)   .0571.3429.6857.8571.88571
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .11198.9E-03.1847.1891.05070
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

9. College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          2   **
EFFECTIVE               7   *******
NEUTRAL                 8   ********
INEFFECTIVE             3   ***
TOTALLY INEFFECTIVE     0   *
NO RESPONSE            15   ***************

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 2     7     8     3     0     15
  FO(X)   .0571.2571.4857.5714.57141
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1119.0769.0153.0966.26360
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

10. Contacts with female industrial arts teachers, especially alumni.

FREQUENCY HISTOGRAM

```
****************************************

VERY EFFECTIVE          5   *****
EFFECTIVE               10   **********
NEUTRAL                 7   *******
INEFFECTIVE             1   *
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             11   **********

****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
****************************************

FREQUENCY 5     10    7     1     1     11
  FO(X)   .1429.4286.6286.6571.68571
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0261.0946.1276.0109.14930
****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

11. Contacts with high school guidance counselors.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          4   ****
EFFECTIVE               4   ****
NEUTRAL                 8   ********
INEFFECTIVE            11   ***********
TOTALLY INEFFECTIVE     3   ***
NO RESPONSE             5   *****

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 4     4     8     11    3     5
  FO(X)   .1143.2286.4571.7714.85711
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0547.1054.0439.1034.02210
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

12. Filmed presentation (slides and tape recorder) of the departmental offerings.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          1   *
EFFECTIVE               12   ***********
NEUTRAL                 7   *******
INEFFECTIVE             6   ******
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             9   *********

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 1     12    7     6     0     9
  FO(X)   .0286.3714.5714.7429.74291
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1404.0374.0704.0749.09210
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

13. College-paid recruiters traveling the state and country.

FREQUENCY HISTOGRAM

```
****************************************

VERY EFFECTIVE        5  *****
EFFECTIVE             5  *****
NEUTRAL               9  *********
INEFFECTIVE           3  ***
TOTALLY INEFFECTIVE   5  *****
NO RESPONSE           8  ********

****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
****************************************

FREQUENCY 5     5     9     3     5     8
  FO(X)   .1429.2857.5429.6286.77141
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0261.0483.0419.0394.06360
****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

14. Contacts with male industrial arts teachers, especially alumni.

FREQUENCY HISTOGRAM

```
****************************************

VERY EFFECTIVE          9   *********
EFFECTIVE               12   ************
NEUTRAL                 8   ********
INEFFECTIVE             2   **
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             4   ****

****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
****************************************

FREQUENCY 9     12    8     2     0     4
  FO(X)   .2571.6    .8286.8857.88571
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0881.266 .3276.2177.05070
****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

15. College-sponsored industrial arts contests for high school pupils.

FREQUENCY HISTOGRAM

```
****************************************

VERY EFFECTIVE        2   **
EFFECTIVE             10   **********
NEUTRAL               2   **
INEFFECTIVE           2   **
TOTALLY INEFFECTIVE   0   *
NO RESPONSE           19   ********************

****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
****************************************

FREQUENCY 2     10    2     2     0     19
  FO(X)   .0571.3429.4    .4571.45711
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .11198.9E-03.101.2109.37790
****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

16. College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          8   ********
EFFECTIVE               11   ***********
NEUTRAL                 10   **********
INEFFECTIVE             1   *
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             4   ****

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 8     11    10    1     1     4
  FO(X)   .2286.5429.8286.8571.88571
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0596.2089.3276.1891.05070
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

17. Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE        8  ********
EFFECTIVE             12  ************
NEUTRAL               3  ***
INEFFECTIVE           4  ****
TOTALLY INEFFECTIVE   2  **
NO RESPONSE           6  ******

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 8     12    3     4     2     6
  FO(X)   .2286.5714.6571.7714.82861
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0596.2374.1561.10346.4E-030
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

18. College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          4   ****
EFFECTIVE               9   *********
NEUTRAL                 9   *********
INEFFECTIVE             6   ******
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             6   ******

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 4     9     9     6     1     6
  FO(X)   .1143.3714.6286.8    .82861
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0547.0374.1276.132 6.4E-030
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS ACCEPTED.

19. Scholarships for industrial arts college programs.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          4   ****
EFFECTIVE               6   ******
NEUTRAL                 6   ******
INEFFECTIVE             4   ****
TOTALLY INEFFECTIVE     0   *
NO RESPONSE            15   ***************

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 4     6     6     4     0     15
  FO(X)   .1143.2857.4571.5714.57141
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0547.0483.0439.0966.26360
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

20. Career days, open house or conference activities.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          6   ******
EFFECTIVE               10   **********
NEUTRAL                 10   **********
INEFFECTIVE             5   *****
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             3   ***

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

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*****************************************

FREQUENCY 6     10    10    5     1     3
  FO(X)   .1714.4571.7429.8857.91431
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      2.4E-03.1231.2419.2177.07930
*****************************************
```

THE CRITICAL VALUE = .229881957

THE NULL HYPOTHESIS IS NOT ACCEPTED.

APPENDIX J: KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST AND FREQUENCY HISTOGRAM-FEMALE INDUSTRIAL ARTS TEACHERS

1. College industrial arts students recruiting other college and high school students.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          16  ****************
EFFECTIVE               19  ********************
NEUTRAL                 6   ******
INEFFECTIVE             3   ***
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             6   ******

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 16    19    6     3     1     6
  FO(X)   .3137.6863.8039.8627.88241
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1447.3523.3029.1947.04740
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

2. Contacts with own college freshmen and counselors.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          6   ******
EFFECTIVE               15   ***************
NEUTRAL                 12   ************
INEFFECTIVE             7   *******
TOTALLY INEFFECTIVE     2   **
NO RESPONSE             9   *********

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 6     15    12    7     2     9
  FO(X)   .1176.4118.6471.7843.82351
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0514.0778.1461.1163.01150
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

3. High school visits by college industrial arts department faculty.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE        7   *******
EFFECTIVE             10   **********
NEUTRAL               18   ******************
INEFFECTIVE           8   ********
TOTALLY INEFFECTIVE   1   *
NO RESPONSE           7   *******

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 7     10    18    8     1     7
  FO(X)   .1373.3333.6863.8431.86271
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .03177E-04.1853.1751.02770
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

4. Personal letters to interested high school pupils.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          7   *******
EFFECTIVE               10   **********
NEUTRAL                 17   ******************
INEFFECTIVE             6   ******
TOTALLY INEFFECTIVE     2   **
NO RESPONSE             9   *********

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 7     10    17    6     2     9
  FO(X)   .1373.3333.6667.7843.82351
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .03177E-04.1657.1163.01150
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

5. Community college visits by college industrial arts department faculty.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          1   *
EFFECTIVE               18   ******************
NEUTRAL                 17   *****************
INEFFECTIVE             3   ***
TOTALLY INEFFECTIVE     3   ***
NO RESPONSE             9   *********

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 1     18    17    3     3     9
  FO(X)   .0196.3725.7059.7647.82351
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1494.0385.2049.0967.01150
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

6. Contacts with high school supervisors and administrators through student teaching programs.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          4   ****
EFFECTIVE              15   ***************
NEUTRAL                14   **************
INEFFECTIVE             5   *****
TOTALLY INEFFECTIVE     4   ****
NO RESPONSE             9   *********

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 4     15    14    5     4     9
  FO(X)   .0784.3725.6471.7451.82351
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0906.0385.1461.0771.01150
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

7. Industrial arts teachers association bringing secondary school pupils to visit the college.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          16  ****************
EFFECTIVE               17  *****************
NEUTRAL                 11  ***********
INEFFECTIVE             4   ****
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             3   ***

*****************************************
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KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 16    17    11    4     0     3
  FO(X)   .313 7.647 1.862 7.941 2.941 21
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .144 7.313 1.361 7.273 2.106 20
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

8. Distribution of brochures to high school and community college students.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE        1   *
EFFECTIVE             14   **************
NEUTRAL               21   **********************
INEFFECTIVE           6   ******
TOTALLY INEFFECTIVE   3   ***
NO RESPONSE           6   ******

*****************************************
```

KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 1     14    21    6     3     6
  FO(X)   .0196.2941.7059.8235.88241
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1494.0399.2049.1555.04740
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

9. College conducting annual recruitment conference on campus for secondary school industrial arts teachers and counselors.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          6   ******
EFFECTIVE               13   *************
NEUTRAL                 17   *****************
INEFFECTIVE             5   *****
TOTALLY INEFFECTIVE     3   ***
NO RESPONSE             7   *******

*****************************************
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KOLMOGOROV-SMIRNOV ANALYSIS

```
*****************************************

FREQUENCY 6     13    17    5     3     7
  FO(X)   .1176.3725.7059.8039.86271
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0514.0385.2049.1359.02770
*****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

10. Contacts with female industrial arts teachers, especially alumni.

FREQUENCY HISTOGRAM

```
*****************************************

VERY EFFECTIVE          17  ****************
EFFECTIVE               15  **************
NEUTRAL                 13  ************
INEFFECTIVE             1   *
TOTALLY INEFFECTIVE     0   *
NO RESPONSE             5   *****

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KOLMOGOROV-SMIRNOV ANALYSIS

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FREQUENCY 17    15    13    1     0     5
  FO(X)   .3333.6275.8824.902  .902  1
  FT(X)   .169  .334  .501  .668  .835  1.000
   D      .1643.2935.3814.234  .067  0
*****************************************
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

11. Contacts with high school guidance counselors.

FREQUENCY HISTOGRAM

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VERY EFFECTIVE          6   ******
EFFECTIVE               11   ***********
NEUTRAL                 13   *************
INEFFECTIVE             8   ********
TOTALLY INEFFECTIVE     9   *********
NO RESPONSE             4   ****

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KOLMOGOROV-SMIRNOV ANALYSIS

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*****************************************

FREQUENCY 6     11    13    8     9     4
  FO(X)   .1176.3333.5882.7451.92161
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .05147E-04.0872.0771.08660
*****************************************
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

12. Filmed presentation (slides and tape recorder) of the departmental offerings.

FREQUENCY HISTOGRAM

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*****************************************

VERY EFFECTIVE        5  *****
EFFECTIVE             17  ****************
NEUTRAL               17  ****************
INEFFECTIVE           5  *****
TOTALLY INEFFECTIVE   0  *
NO RESPONSE           7  *******
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KOLMOGOROV-SMIRNOV ANALYSIS

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FREQUENCY 5     17    17    5     0     7
  FO(X)   .098 .4314.7647.8627.86271
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .071 .0974.2637.1947.02770
*****************************************
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

13. College-paid recruiters traveling the state and country.

FREQUENCY HISTOGRAM

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VERY EFFECTIVE        5  *****
EFFECTIVE             10  **********
NEUTRAL               17  ******************
INEFFECTIVE           7  *******
TOTALLY INEFFECTIVE   4  ****
NO RESPONSE           8  ********

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KOLMOGOROV-SMIRNOV ANALYSIS

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****************************************

FREQUENCY 5     10    17    7     4     8
  FO(X)   .098 .2941.6275.7647.84311
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .071 .0399.1265.09678.1E-030
****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

14. Contacts with male industrial arts teachers, especially alumni.

FREQUENCY HISTOGRAM

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*****************************************

VERY EFFECTIVE        9   *********
EFFECTIVE             24   ************************
NEUTRAL               10   **********
INEFFECTIVE           5   *****
TOTALLY INEFFECTIVE   0   *
NO RESPONSE           3   ***

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KOLMOGOROV-SMIRNOV ANALYSIS

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FREQUENCY 9     24    10    5     0     3
  FO(X)   .1765.6471.8431.9412.94121
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      7.5E-03.3131.3421.2732.10620
*****************************************
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

15. College-sponsored industrial arts contests for high school pupils.

FREQUENCY HISTOGRAM

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VERY EFFECTIVE          19  ********************
EFFECTIVE               13  *************
NEUTRAL                 7   *******
INEFFECTIVE             5   *****
TOTALLY INEFFECTIVE     1   *
NO RESPONSE             6   ******

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KOLMOGOROV-SMIRNOV ANALYSIS

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FREQUENCY 19    13    7     5     1     6
  FO(X)   .3725.6275.7647.8627.88241
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .2035.2935.2637.1947.04740
*****************************************
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

16. College industrial arts department offering general education courses which stimulates the interest of non-industrial arts majors.

FREQUENCY HISTOGRAM

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****************************************

VERY EFFECTIVE          17  ****************
EFFECTIVE               21  **********************
NEUTRAL                  4  ****
INEFFECTIVE              2  **
TOTALLY INEFFECTIVE      1  *
NO RESPONSE              6  ******

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KOLMOGOROV-SMIRNOV ANALYSIS

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****************************************

FREQUENCY 17    21    4     2     1     6
  FO(X)   .3333.7451.8235.8627.88241
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1643.4111.3225.1947.04740
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```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

17. Impact of modern facilities and programs attracting high school pupils and their parents during visits to college.

FREQUENCY HISTOGRAM

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****************************************

VERY EFFECTIVE        11  ***********
EFFECTIVE             17  *****************
NEUTRAL               13  *************
INEFFECTIVE           2   **
TOTALLY INEFFECTIVE   0   *
NO RESPONSE           8   ********

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KOLMOGOROV-SMIRNOV ANALYSIS

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****************************************

FREQUENCY 11    17    13    2     0     8
  FO(X)   .2157.549 .8039.8431.84311
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0467.215 .3029.17518.1E-030
****************************************
```

THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

18. College industrial education faculty indicating advantages of industrial arts teaching to non-majors in the department.

FREQUENCY HISTOGRAM

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*****************************************

VERY EFFECTIVE        1   *
EFFECTIVE             18   ******************
NEUTRAL               16   ****************
INEFFECTIVE           4   ****
TOTALLY INEFFECTIVE   2   **
NO RESPONSE           10   **********

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KOLMOGOROV-SMIRNOV ANALYSIS

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*****************************************

FREQUENCY 1     18    16    4     2     10
  FO(X)   .0196.3725.6863.7647.80391
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .1494.0385.1853.0967.03110
*****************************************
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS ACCEPTED.

19. Scholarships for industrial arts college programs.

FREQUENCY HISTOGRAM

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*****************************************

VERY EFFECTIVE        20  ********************
EFFECTIVE             18  ******************
NEUTRAL               6   ******
INEFFECTIVE           1   *
TOTALLY INEFFECTIVE   0   *
NO RESPONSE           6   ******

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KOLMOGOROV-SMIRNOV ANALYSIS

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*****************************************

FREQUENCY 20    18    6     1     0     6
  FO(X)   .3922.7451.8627.8824.88241
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .2232.4111.3617.2144.04740
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

20. Career days, open house or conference activities.

FREQUENCY HISTOGRAM

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*****************************************

VERY EFFECTIVE          11   ***********
EFFECTIVE               18   ******************
NEUTRAL                 12   ************
INEFFECTIVE             3    ***
TOTALLY INEFFECTIVE     1    *
NO RESPONSE             6    ******

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KOLMOGOROV-SMIRNOV ANALYSIS

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*****************************************

FREQUENCY 11    18    12    3     1     6
  FO(X)   .2157.5686.8039.8627.88241
  FT(X)   .169 .334 .501 .668 .835 1.000
   D      .0467.2346.3029.1947.04740
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THE CRITICAL VALUE = .190438091

THE NULL HYPOTHESIS IS NOT ACCEPTED.

APPENDIX K: FEMALE INDUSTRIAL ARTS TEACHERS STATE OF RESIDENCE

Number	State
1	Arizona
2	Connecticut
2	Florida
3	Georgia
1	Iowa
2	Maryland
2	Michigan
2	Minnesota
2	Mississippi
5	Missouri
1	Nebraska
3	New Jersey
3	New York
1	North Carolina
1	Ohio
3	Oklahoma
2	Oregon
6	Pennsylvania
2	South Carolina
1	South Dakota
7	Texas
1	Tennessee
1	Utah
3	Virginia
1	Washington
1	Wisconsin
1	Wyoming
57	

APPENDIX L: FEMALE INDUSTRIAL ARTS TEACHERS HOBBIES OR OTHER SPECIAL INTERESTS

Sports (43)
- Skiing (6)
- Camping (4)
- Hiking (2)
- Basketball (3)
- Swimming (6)
- Fishing (3)
- Softball (7)
- Volleyball (8)
- Bowling (3)
- Track and running (6)
- Field hockey (2)
- Tennis (8)
- Golf (2)
- Rock climbing (1)
- Football (2)
- Biking (4)
- Racquetball (3)
- Target pistol shooting (1)
- Weightlifting (1)
- Scuba diving (1)
- Canoeing (1)
- Soccer (1)
- Hunting (1)
- Lacrosse (1)
- Horseback riding (1)
- Aerobics (1)

Music and Dance (27)
- Guitar (4)
- Polka (1)
- Flute (1)
- Dancing (5)
- Punk-new wave (1)
- Belly dancing (1)
- Piano (3)
- Organ (1)
- Saxophone (1)
- Ballet (1)
- Folk dance (1)
- Clarinet (1)
- Square dancing (1)
- Vocal (1)
- Aerobic dance (1)
- Modern dance (1)

Service Organizations (19)
- AIAA (3)
- State or County IA Assoc.(5)
- Girl Scouts
- AVA (2)
- State Vocational Assoc. (1)
- AIASA (2)
- 4-H (1)
- School organization (1)

Church or Civic Activities (17)

Another Business (10)
- Cabinetmaker (1)
- Free lance graphic designer (1)
- Printing (1)
- Real estate (1)
- Dog breeder (1)
- Design and printing (1)
- Catering (1)
- General woodworking (1)
- Photography & calligraphy(1)
- Ski shop sales & darkroom technician (1)

Other (30)
- Photography (9)
- Reading (5)
- Cooking (4)
- Drawing (2)
- Sewing (11)
- Woodworking (7)
- Antiques (1)
- Crafts (9)
- Art (1)
- Travel (1)
- Theater (1)
- 4-wheeling (1)
- Family (1)
- Gardening (1)
- People (1)

APPENDIX M: FEMALE INDUSTRIAL ARTS TEACHERS OTHER WORK EXPERIENCE

Clerk (13)
Waitress (12)
Drafting (7)
Graphics (6)
Cashier (5)
Secretary (5)
Construction (4)
Camp counselor (4)
Tutoring (3)
Artist (3)
Photographer (3)
Lifeguard (3)
Receptionist (2)
Babysitting (2)
Cook (2)
Painting (2)
Art teacher (2)
Recreation supervisor (2)
Florist (2)
Camp Fire girls (2)
Remodeling (2)
Computer programmer (2)
Factory worker (2)
Independent contractor
Cleaning
Mail clerk
Truck driver
Engineer
Process camera operator
Apartment maintenance
Basketball/volleyball official
Funeral home
Car parts worker
Adult education teacher
Key punch operator
Woodworking
Girl scouts
Sprinkler engineer
Dinner theater
Lawn service
Swimming teacher
Insurance auditor
Metal worker
Architectural antiques
Guidance counselor
Dental assistant
Bookkeeper
Residence hall advisor
Farm work
National Guard
Physical education teacher
Printer
Furniture restoration
Assistant store manager
State park maintenance
Garment factory
General home maintenance
Recreation therapist
Recreation director
Theater assistant manager
Forest products factory
Animal skinner
Dog breeder
Chauffeur

APPENDIX N: FEMALE INDUSTRIAL ARTS TEACHERS OTHER CAREERS CONSIDERED

Architecture (7)
Engineering (7)
Graphics (6)
Drafting/design (6)
Secondary education (4)
Commercial art (3)
Technical illustrator (3)
Interior design/decorator (3)
Business training (3)
Photographer (3)
Writing (2)
Business administrator (2)
School administrator (2)
Contractor
Elementary education
Lumberyard/hardware store
Music education
Teaching overseas
Plumber
Park ranger
Furniture builder
Drama
Music
Apartment owner
Catering
Recreation therapist
Restaurant/hotel manager
Journalism
Law school
Physical therapy
Occupational therapy
Professional printer
Home economics
Chemistry
Accounting
Dancing
Leatherwork
Antiques
Computer graphics
School psychologist
Safety engineer
Cabinet maker
Quality control
Psychologist
Public relations
Airlines
Model
School counselor
Computer programmer

APPENDIX O: HUMAN SUBJECTS COMMITTEE APPROVAL STATEMENT

INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH
IOWA STATE UNIVERSITY
(Please follow the accompanying instructions for completing this form.)

1. Title of project (please type): Women in Industrial Arts--A Recruitment Model

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

Marie Theobald — Typed Named of Principal Investigator
6/24/81 — Date
Signature of Principal Investigator

1411 Douglas — Campus Address
232-2336 — Campus Telephone

3. Signatures of others (If any) | Date | Relationship to Principal Investigator

	6/24/81	Major Professor

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

- ☐ Medical clearance necessary before subjects can participate
- ☐ Samples (blood, tissue, etc.) from subjects
- ☐ Administration of substances (foods, drugs, etc.) to subjects
- ☐ Physical exercise or conditioning for subjects
- ☐ Deception of subjects
- ☐ Subjects under 14 years of age and(or) ☐ Subjects 14-17 years of age
- ☐ Subjects in institutions
- ☐ Research must be approved by another institution or agency

5. ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.

- ☐ Signed informed consent will be obtained.
- ☒ Modified informed consent will be obtained.

6. Anticipated date on which subjects will be first contacted: Month 7 Day 15 Year 81

Anticipated date for last contact with subjects: Month ___ Day 31 Year 81

7. If Applicable: Anticipated date on which audio or visual tapes will be erased and(or) identifiers will be removed from completed survey instruments:

Month ___ Day ___ Year ___

8. Signature of Head or Chairperson | Date | Department or Administrative Unit

	7/15/81	Industrial Education

9. Decision of the University Committee on the Use of Human Subjects in Research:

☒ Project Approved ☐ Project not approved ☐ No action required

George G. Karas — Name of Committee Chairperson
7/22/81 — Date
Signature of Committee Chairperson